



American Red Cross
Advisory Council on
First Aid and Safety

The American Red Cross
2005 GUIDELINES
for EMERGENCY CARE
and EDUCATION

Table of Contents

Introduction	1
Levels of Training	1
Age Delineation.....	1
Education	3
American Red Cross Response Readiness Model.....	3
Skill Retention.....	3
Simplification of Skill Sequences	3
“Practice-While-You-Watch” Video Instruction.....	4
Guidelines for Adult	6
CPR	6
Check the Scene	6
Check the Victim.....	6
Call	7
Signs of Life	7
Rescue Breaths	8
Check for a Pulse.....	8
Rescue Breathing.....	8
Chest Compressions	9
Automated External Defibrillator.....	9
Choking	10
Recovery Position.....	11
Guidelines for Children and Infants	12
CPR	12
Check the Scene	12
Check the Victim.....	12
Call	13
Signs of Life	13
Rescue Breaths	14
Check for a Pulse.....	15
Rescue Breathing.....	15
Chest Compressions	16
Automated External Defibrillation	17
Choking	17
Recovery Position.....	18
Algorithms	19
Adult CPR/AED – Professional Rescuer	19
Adult CPR/AED – Certified Lay Responder.....	20
Adult CPR/AED – Community Responder	21
Conscious Choking.....	22
Unconscious Choking – Professional Rescuer	23
Unconscious Choking, Adult – Certified Lay Responder	24
Unconscious Choking, All – Community Responder	25
Child Infant CPR/AED – Professional Rescuer	26
Child/Infant CPR/AED – Certified Lay Responder	27
Child/Infant CPR – Community Responder	28
Unconscious Choking, Child/Infant – Certified Lay Responder.....	29

AMERICAN RED CROSS 2005 GUIDELINES FOR EMERGENCY CARE AND EDUCATION

PART 1: INTRODUCTION

This document represents American Red Cross (ARC) interpretations of the 2005 International Consensus on Science with Treatment Recommendations (CoSTR) for cardiopulmonary resuscitation (CPR) and automated external defibrillators (AED) and is based on review of the current science on care and education and the expert input of American Red Cross volunteers and professional staff.

LEVELS OF TRAINING

For the purpose of organizing its training programs in terms of appropriate knowledge and skill levels, the American Red Cross recognizes three levels of responders in emergency care situations. While establishing different levels of training to meet the needs of different categories of responders, these categories are not meant to set up exclusive levels of training. The American Red Cross supports individuals taking any course or program based upon interest as well as needs.

PROFESSIONAL RESCUER (LEVEL 1)

Any person with formal training who has a primary professional duty to respond to emergencies, such as lifeguards, police officers, athletic trainers, firefighters and other first responders.

CERTIFIED LAY RESPONDER (LEVEL 2)

A person with some formal training who has a secondary, i.e., workplace related duty-to-act, as designated by job or position responsibilities including workplace emergency response or first aid team members, flight attendants, security guards, teachers and childcare providers.

LAY COMMUNITY RESPONDER (LEVEL 3)

Any person with either some or no formal training, who has no duty-to-act. This person could be a bystander, a family member or any individual in the community who decides to act and help another person in need of first aid or emergency care.

AGE DELINEATION

The delineation of age levels has been traditionally arbitrary in nature and does not completely reflect patterns of injury and illness. In addition, responders may find exact age determination difficult. As a result, the American Red Cross has established age categories for emergency care which are based on epidemiological patterns of injury including care needed, while at the same time being easy to recognize based on the person's appearance.

In general, infants and children suffer predominantly respiratory emergencies which if untreated can lead to cardiac emergencies. Adolescents and adults will often suffer primary cardiac events. Lastly an individual can generally look at a victim and determine if they are an infant, child, adolescent or adult. While on occasion an individual may categorize a large 13 month old as an infant or a small 13 year old as a child, this would not have any significant impact on care and would be far outweighed by the ease of recognition.

Based on this physiological, epidemiological and recognition approach, the following general age groups have been developed. While these categories of age are based on appearance of broad categories of children, specific ages are given should the age be readily known.

Infant--Is anyone who appears to be under 1 year of age.

Child--Anyone who appears to be between the ages of 1 year and about 12 years of age. For AED, based on FDA approval of these devices—a child is considered between the ages of 1 and 8 or less than 55 pounds. If precise age or weight is

not known the responder should use his or her best judgment and not delay care in determining age.

Adult--Is anyone approximately 12 years old or older.

PART 2: EDUCATION

INTRODUCTION

The new American Red Cross First Aid/CPR/AED materials reflect changes based on scientific findings in the field of resuscitation as described in the 2005 International Consensus on CPR and Emergency Cardiovascular Care Science with Treatment Recommendations, plus research findings in education. The Red Cross methods for teaching first aid and CPR are a result of several years of research and testing to discover more effective ways to teach skills and improve skill retention. This summary addresses:

- The American Red Cross Response Readiness Model
- Skill retention and length of certification;
- Simplification of CPR skill sequences that make training easier, improve retention and build students' confidence so they are more likely to provide appropriate care in emergency situations; and
- The Practice-While-You-Watch skill instruction method, which makes it easier for instructors to provide individual feedback and increase in-class practice time as needed, thereby improving skill acquisition and retention.

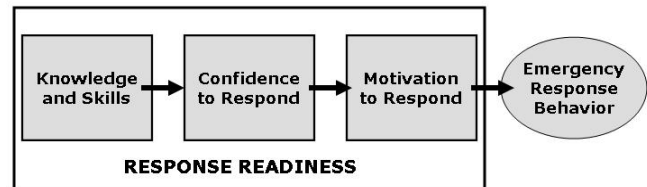
AMERICAN RED CROSS RESPONSE READINESS MODEL

The Red Cross has developed a conceptual model based on the Theory of Reasoned Action (Ajzen and Fishbein, 1980). This theory describes the process through which new information and education influence behavior.

The Red Cross Response Readiness model is shown below (Figure 1). During Red Cross courses, students learn life-saving knowledge and skills. Knowledge and skill proficiency increase their confidence in their ability to respond. With knowledge, skills, and confidence, students' attitudes about performing the skills in real life situations improves, which increases their intention to act. Ultimately, their intentions

determine whether or not they will actually perform first aid or CPR skills when faced with an emergency.

Figure 1: The American Red Cross Readiness Response Model



SKILL RETENTION

A review of the research on retraining intervals found documented decay in the skills of healthcare providers after intervals as short as six weeks and as long as two years (ILCOR, 2005). Although the evidence evaluation recognizes that frequent retraining is necessary to maintain skills, the research did not define optimal intervals for retraining. In a separate literature review, of 28 studies pertaining to CPR skills retention, the Red Cross (Gallagher, 2002) found no evidence to support two years as an adequate interval between trainings. Some studies questioned whether one-year was too long (Fosell, et al, 1983; Gass & Curry, 1983). Many studies (e.g. Berden, et al. 1994; Braun 2002; Dracup, et al, 1998) pointed to the need for frequent education, reviews and skills practice. None of the studies reviewed found sufficient skill retention in health care professionals beyond six months (Gallagher, 2002).

SIMPLIFICATION OF SKILL SEQUENCES

Two components essential to the future performance of CPR skills are the acquisition of the skills through training and the retention of learned skills after training. Because CPR skill sequences involve many steps, decision points, and distinct skills, students have more trouble learning CPR than they do less complex skill sets.

To make instruction in CPR more effective and encourage retention, CPR skills steps have been simplified as described below. (ILCOR 2005).

UNIVERSAL COMPRESSION-VENTILATION RATIO

One universal compression-ventilation ratio of 30:2 for adult, child and infant (ILCOR 2005). This further limits the time between compressions and breaths and increases the number of compressions given in one minute. Because professional rescuers are experienced and perform the skills frequently, ILCOR (Biarent et al., 2005; Handley et al., 2005; ILCOR 2005) concluded that they could learn and remember more complicated algorithms (i.e., they will follow a 15:2 ratio for 2-person CPR for children and infants).

HAND PLACEMENT

Hand placement in the middle of the chest (ILCOR, 2005; Handley et al., 2005). Because hand placement affects the quality of CPR and because rescuers need to position their hands to give compressions as quickly as possible in order to minimize interruptions of compressions, ILCOR (2005) recommended simplifying instruction on hand placement with less detail in anatomical landmarking by giving students the simple instruction to “place your hands in the center of the chest.”

“PRACTICE-WHILE-YOU-WATCH” VIDEO INSTRUCTION

Numerous CPR outcome studies have indicated that laypeople’s CPR skills acquisition and retention are poor after traditional classroom training (Chamberlain & Hazinski, 2003). ILCOR (Chamberlain & Hazinski, 2003; ILCOR 2005) recommends not restricting CPR instruction methods to traditional techniques. Newer educational strategies, such as video self-instruction programs, may be more effective at getting students practicing skills immediately and performing better on skills tests immediately following instruction (Braslow et al, 1997; Todd et al, 1998; Knox et al, 1999; Batcheller et al, 2000).

The American Red Cross has adapted for classroom use an innovative method originally designed for video self-instruction. With the “practice-while-you-watch” method, students benefit from the value of video self-instruction plus increased individual instructor feedback and assessment during training. The use of “practice-while-you-watch” video instruction in the classroom setting allows students to learn from improved video instruction, while gaining the certification so many need to meet workplace requirements.

The Red Cross evaluated “practice-while-you-watch” in several trials while the program was in development. After each classroom test, the video and the training were revised to incorporate improvements to the course. All tests and observations of this new method have shown that students are fully and enthusiastically engaged in skill practice without some of the hesitation that has been observed in the past. The data that has been collected so far confirms that student outcomes, including learning, are at least as good in the new method as in the old method. Initial skills testing comparing the use of a small segment of “practice-while-you-watch” with traditional skill instruction showed that students performed as well as traditionally trained students in 14 out of the 25 CPR skills tested, and better than the traditionally trained students in 11 out of the 25 skills tested. Future research will reveal more about how the innovation improves skill performance and skill retention.

References

- Azjen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviors*. Englewood Cliffs, NJ: Prentice Hall.
- Batcheller, A.M., Brennan, R.T., Braslow, A., Urrutia, A., & Kaye, W. (2000). Cardiopulmonary resuscitation performance of subjects over forty is better following half-hour video self-instruction compared to traditional four-hour classroom training. *Resuscitation*, 43, 101-110.

- Berden, H.J., Bierens, J.J., Willems, F.F., Hendrick, J.M., Pijls, N.H., and Knape, J.T. (1994). Resuscitation skills of lay public after recent training. *Annals of Emergency Medicine*, 23(5), 1003-1008.
- Biarent, D., Bingham, R., Richmond, S., Maconochie, I., Wyllie, J., Simpson, S., Rodriguez Nunez, A., and Zideman, D. (2005). European Resuscitation Council guidelines for resuscitation 2005, section 6: Pediatric life support. *Resuscitation*, 67S1, S97-S133.
- Braslow, A., Brennan, R.T., Newman, M.M., Bircher, N.G., Batcheller, A.M., & Kaye, W. (1997). CPR training without an instructor: Development and evaluation of a video self-instructional system for effective performance of cardiopulmonary resuscitation. *Resuscitation*, 34, 207-220.
- Braun, O. (2002). Defibrillators & CPR/Maximizing skill retention: Current educational theory supports online CPR training. *Occupational Health & Safety*, 71(12), 40-44.
- Chamberlain, D.A. and Hazinski, M.F. on behalf of the European Resuscitation Council, the American Heart Association, the Heart and Stroke Foundation of Canada, the Australia and New Zealand Resuscitation Council, the Resuscitation Council of Southern Africa, the Consejo Latino-Americano de Resuscitacion. (2003). ILCOR advisory statement: Education in resuscitation. *Resuscitation*, 59, 11-43.
- Dracup, K., Moser, D., Doering, L., and Evangelista, L. (1998). Retention and use of cardiopulmonary resuscitation skills in parents of infants at risk for cardiopulmonary arrest. *Pediatric Nursing*, 24(3), 219-225.
- Fossel, M., Kiskaddon, R.T., and Sternbach, G.L. (1983). Retention of cardiopulmonary resuscitation skills by medical students. *Journal of Medical Education*, 58(7), 568-575.
- Gallagher, A. (2002). CPR motivation and skill retention: Evidence to support one-year certification. Report Published Online <http://www.redcross.org/services/hss/resources/retention.html>
- Gass, D.A. and Curry, L. (1983). Physician's and nurses' retention of knowledge and skill after training in cardiopulmonary resuscitation. *Canadian Medical Association Journal*, 128(5), 550-551.
- Handley, A.J., Koster, R., Monsieurs, K., Perkins, G.D., Davies, S., and Bossaert, L. (2005). European Resuscitation Council guidelines for resuscitation 2005, section 2: Adult basic life support and use of automated external defibrillators. *Resuscitation* 67S1, S7-S23.
- International Liaison Committee on Resuscitation. (2005). The 2005 international consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations. *Resuscitation*, 67, 157-314.
- Knox, H.T., Heron, S.L., Thompson, M., Dennis, R., O'Connor, J., & Kellermann, A.L. (1999). Simple CPR: A randomized, controlled trial of video self-instructional cardiopulmonary resuscitation training in an African American church congregation. *Annals of Emergency Medicine*, 34(6), 730-737.
- Todd, K.H., Braslow, A., Brennan, R.T., Lowery, D.W., Cox, R.J., Lipscomb, L.E., Kellermann, A.L. (1998). Randomized, controlled trial of video self-instruction versus traditional CPR training. *Annals of Emergency Medicine*, 31(3), 364-369.

PART 3: ADULT

INTRODUCTION

These interpretations are based on the 2005 Consensus on Science with Treatment Recommendations (CoSTR), review of the current science on care and education and the expert input of American Red Cross volunteers and professional staff.

For the purpose of these guidelines, an adult is considered anyone 12 years old and older. This age span takes into account the epidemiology of cardiac arrest events.

CPR SEQUENCE FOR ADULTS

This sequence and choice of skills is reflected in the American Red Cross CPR/AED Algorithms ([Figure 2: Professional Rescuer](#); [Figure 3: Certified Lay Responder](#); and [Figure 4: Lay Community Responder](#)) and are based upon the 2005 CoSTR Universal Algorithm, review of the current science on care and education and the expert input of American Red Cross volunteers and professional staff (p. III-3) (p. III-73).

***NOTE:** Responder levels are noted separately throughout this document where skill sequences or care steps are different between levels of responders.*

CHECK THE SCENE FOR SAFETY (Box 1)

Once the responder identifies a potential emergency situation, the responder should check the scene (survey the scene or “scene size-up”) to make sure that it is safe for both the responder and the victim(s). Checking the scene involves scanning the area for the number of victims present, what may have happened and what help is available.

Responders should not move the victim(s) unless it is absolutely necessary for safety reasons (i.e. the scene is or becomes unsafe).

CHECK THE VICTIM (Box 2)

Once the responder has checked to see that the scene is safe, he or she should check for responsiveness. He or she should tap the victim on the shoulder and shout, “Are you OK?”

Responsive (Conscious)—If the victim responds, but is injured or needs medical assistance, someone should call 9-1-1 or the local emergency number and obtain whatever first aid supplies are available

If trained, the responder should ask for consent and then check the person from head to toe. Briefly interview them to find what might be wrong. Responders should then give care based on conditions found, and according to their level of training.

If alone, the responder should leave the victim resting as comfortably as possible, then activate EMS and return to the victim as quickly as possible. The victim’s condition should be re-checked frequently.

Professional Rescuer - If the victim does not have any life-threatening conditions, a secondary assessment should be performed. This assessment includes interviewing the victim (if verbal) and bystanders while conducting a head to toe examination. Be sure to watch for changes in consciousness and breathing. The acronym S.A.M.P.L.E. should be used to interview the victim (**S**igns or symptoms; **A**llergies; **M**edications; **P**ertinent past history; **L**ast oral intake; and **E**vents leading to the incident).

Unresponsive—If the person *does not* respond immediately, someone should be asked to call 9-1-1 or the local emergency number. The responder should give care for person based on the conditions found.

Standard or BSI (body substance isolation) precautions should be taken to prevent disease

transmission when giving care. This is done through using personal protective equipment (PPE), such as disposable gloves, protective eyewear and CPR breathing barriers (such as face shields and resuscitation masks.). It is also important to wash hands with soap and warm water immediately after giving care (even if disposable gloves were used).

CALL 9-1-1 OR THE LOCAL EMERGENCY NUMBER (Box 3)

Calling 9-1-1 or the local emergency number should be done for any life-threatening emergency (i.e., unconsciousness, breathing problems, chest pain or discomfort lasting more than 3-5 minutes or that goes away and comes back and for severe bleeding).

When 2 or more responders are present, 1 responder should care for the victim, while the other responder activates EMS and gets the AED, if it is available.

Call First--If a lone responder finds an unresponsive adult (no movement or response to stimulation given); the cause is likely to be cardiac related. The responder should activate EMS (call 9-1-1 or the local emergency number), get an AED (if available) and return to the victim to give care.

Care First--If a lone responder is giving care to an unresponsive victim of a drowning or other incident that is likely to be a respiratory-related event, he or she should give 5 cycles or about 2 minutes of CPR before leaving the victim to activate EMS.

CHECK FOR SIGNS OF LIFE (Box 4)

If an unresponsive victim is face down, roll the victim into a face-up position. If possible, the victim should be on a firm, flat surface. The responder should then open the airway and look for movement and look, listen and feel for breathing for no more than 10 seconds using the methods described below.

OPEN THE AIRWAY

Studies have shown that the most effective method of opening the airway is the head tilt chin lift method. In addition studies have shown that even professional rescuers move the cervical spine when performing the modified jaw thrust. Furthermore the modified jaw thrust does not consistently open the airway effectively. When taking this scientific information into account and understanding that establishing an open airway is of paramount importance, the following approach to opening the airway has been established.

Professional Rescuer-- Use the head-tilt/chin-lift technique to open the airway of a person with no suspected head, neck or back injury. If there is a possible head, neck or back injury, perform a jaw thrust maneuver. If the jaw thrust maneuver fails to open the airway, use the head-tilt/chin-lift method.

Use manual in-line spinal stabilization rather than immobilization devices, for victims with suspected spinal injury (p. III-10).

Certified Lay Responder and Lay Community Responder--Use the head-tilt/chin-lift technique for a victim with or without possible head, neck or back injury. The jaw-thrust technique is no longer recommended for the certified lay and the lay responder for the reasons previously explained.

CHECK FOR SIGNS OF LIFE

Checking for signs of life is defined as looking for movement and checking for breathing by looking (for the chest to rise and fall), listening (for the sounds of breathing) and feeling (for breaths on your skin) for no more than 10 seconds.

Signs of life--If there are signs of life; provide care as needed, according to the responder's level of training. It is important to frequently re-check for signs of life as the condition of an unconscious person may change rapidly.

No signs of life--If in an adult there are no signs of life as evidenced by an absence of breathing and movement, proceed to giving 2 rescue breaths (Box 5). It is important to note that if the victim takes an occasional irregular, gasping or shallow

breath, responders should treat the victim as if he or she is not breathing. (III-6)

GIVE 2 RESCUE BREATHS (Box 5)

To give a rescue breath, tilt the head back and lift the chin, then pinch the nose shut. Take a normal (not a deep) breath and make a complete seal over the person's mouth. Blow into the person's mouth to make the chest clearly rise. Each rescue breath should last for about 1 second.

If the breaths do not make the chest rise, tilt the head further back and try the breaths again. If the second attempt to give breaths does not make the chest rise, then care for the victim as an unconscious choking victim (See Unconscious Choking Box B).

CPR BREATHING BARRIERS—FACE SHIELDS AND RESUSCITATION MASKS.

Professional Rescuer--It is recommended that a resuscitation mask or a Bag Valve Mask be used during rescue breathing. Resuscitation masks are flexible, dome-shaped devices that fit over the victim's nose and mouth and allow the rescuer to breathe air into the victim's lungs without making mouth-to-mouth contact. These devices are equipped with a one-way valve system and may be able to be connected to supplemental oxygen.

A Bag Valve Mask is another method of delivering rescue breaths without mouth to mouth contact while providing supplemental oxygen. Effective ventilations using a bag valve mask (BVM) is a challenging task and is most effective when it is provided by 2 rescuers. Ventilations provided with the use of a BVM should be provided in about 1-second, and with enough volume to make the chest clearly rise.

Certified Lay Responder--A face shield can be used; however, it is recommended that the responder switch to a resuscitation mask as soon as possible.

Lay Community Responder--If possible, use a face shield for protection against disease transmission.

SPECIAL CIRCUMSTANCES

Mouth-to-Stoma--To give rescue breaths for a person with a stoma, the responder should look, listen and feel for breathing, placing his or her ear above the stoma. To give rescue breaths to this person, the responder should breathe into the stoma at the same rate as he or she would breathe into the victim's mouth, using mouth-to-stoma breathing or using a well-sealing, round pediatric resuscitation mask.(III-6). If possible, pinch the nose and close the mouth as some patients with a stoma may still have a passage for air that reaches the mouth and nose in addition to the stoma.

Mouth-to-Nose--Providing rescue breaths through a mouth-to-nose technique is an acceptable alternative to providing rescue breaths when the mouth-to-mouth technique is not effective. With the victim's head tilted back, close the mouth by pushing in on the chin. The responder should seal his or her mouth over the victim's nose and give rescue breaths through the victim's nose. If possible, open the person's mouth between rescue breaths to let air out.

CHECK FOR A PULSE (Box 6)

For Professional Rescuer

If the 2 rescue breaths go in, the responder should check for a pulse, at the carotid artery, for no more than 10 seconds and quickly scan for severe bleeding, then care for the conditions found.

Note: Certified Lay Responders and Lay Community Responders do not check the pulse of an adult victim. The assumption is that the cause of the adult victim's life-threatening condition is cardiac in nature. The scientific evidence suggests that accurate pulse checks are difficult to achieve.

RESCUE BREATHING (Box 6A)

For Professional Rescuer

If a victim is not breathing, but has a pulse, begin rescue breathing. Provide rescue breaths at a rate of 1 breath about every 5 seconds. After 2 minutes, recheck for signs of life and a pulse for no more than 10 seconds, then care for the conditions found.

Professional Rescuer: Two-Rescuer Bag Valve Mask—Giving effective ventilations using a bag valve mask (BVM) is a challenging task and is most effective when it is provided by 2 rescuers. Ventilations provided with the use of a BVM should be provided in about 1-second, and with enough volume to make the chest clearly rise and sufficient time allowed for exhalation.

CHEST COMPRESSIONS (Box 7)

If the adult shows no signs of life (for the professional rescuer has no pulse), perform a series of 30 chest compressions and 2 rescue breaths. (III-9)

CHEST COMPRESSION TECHNIQUE

Correct chest compression technique is essential for quality CPR. Effective chest compressions provide blood flow through the victim that delivers critical amounts of oxygen to the victim's heart and brain. Chest compressions can also increase the likelihood that a successful shock can be delivered by an AED to a person suffering a sudden cardiac arrest (SCA), especially if more than 4 minutes have elapsed since the victim's collapse.

Hand Placement—The responder's hands should be positioned in the center of the victim's chest, with the responder's dominant hand on bottom. Studies using this technique showed an improved quality of chest compressions with shorter pauses between chest compressions and ventilations. (III-7)

Compression Rate and Depth—The chest compressions should be given at a rate of 100 compressions per minute (if 100 straight compressions were given), followed by 2 rescue breaths, each providing a visible rise of the victim's chest, and lasting for about 1-second each. Each compression should be approximately 1 ½ - 2 inches in depth and allow for the chest to completely return to its normal position (decompress, or fully recoil) following each compression.

INTERRUPTING CPR

Professional Rescuers—Professional rescuers should continue CPR, without interruption as long as possible, and attempt to limit any interruptions, except for specific interventions such as the insertion of an advanced airway by an arriving advanced medical care provider or the use of a defibrillator.

Certified Lay Responders and Lay Community Responders—Cycles of 30 chest compressions and 2 rescue breaths should be continued until an AED arrives and is ready to use, advanced medical help arrives and takes over, or the victim shows an obvious sign of life.

SPECIAL CIRCUMSTANCES

Compression Only CPR--The use of compression only CPR has significant benefit for persons suffering from cardiac arrest. The use of full CPR (with rescue breaths) is better than compression only CPR. If responders are unable, unwilling or untrained to give full CPR, they should be encouraged to give continuous chest compressions, as they can be beneficial in circulating blood that contains some oxygen to the victim. (III-7)

Professional Rescuers: 2-rescuer CPR--If two professional rescuers are available they should switch roles about every 5 cycles or two minutes and should take less than 5 seconds to make the switch (between compressor and ventilator). Minimize interruption of CPR when changing places.

AUTOMATED EXTERNAL DEFIBRILLATION (Box 8)

When an automated external defibrillator (AED) becomes available and ready, the responder should stop CPR and allow the AED to analyze the heart rhythm of the victim.

The AED should be used as soon as it is available. In some cases, this may mean that the responder stops CPR before finishing 5 cycles. If two persons are present, one responder should continue CPR while the other person prepares and attaches the AED.

If the AED advises that a shock is needed, the responder should follow the prompts to provide 1 shock, followed immediately by 5 cycles (or about 2 minutes) of CPR (III-17)

After 2 minutes of CPR, the AED may advise that no shock is needed. In that case, the responder should then resume CPR.

Responders may be faced with using an AED that is not updated to the 2005 recommended shock protocol. In that case, always follow the prompts of the AED that is being used.

CHOKING

Choking is a common breathing emergency. When a person shows signs that he or she is choking, responders must act quickly to relieve the obstruction.

CONSCIOUS CHOKING

This sequence and choice of skills are reflected in the American Red Cross Conscious Choking Algorithm ([Figure 5](#)) and are based upon the review of the current science on care and education and the expert input of American Red Cross volunteers and professional staff.

If a person can cough forcefully, encourage the person to do so.

If a person cannot cough forcefully, speak or breathe, the person may be choking. There are several techniques for clearing an obstruction: back blows, abdominal thrusts and chest thrusts. Because there is *no* evidence which technique is better and there is *clear* evidence that in many victims if one method does not work another method sometimes does, the technique for conscious choking is a series of back blows followed by abdominal thrusts (p. III-6). In addition when you approach a victim from the front, as taught, you are in a natural position to deliver back blows first.

Back Blows and Abdominal Thrusts

The responder should take a position slightly behind the victim. Provide support by placing one

arm diagonally across the chest and lean the person forward.

The responder should firmly strike the person between the shoulder blades with the heel of the other hand five times. If the back blows do not dislodge the object, give five abdominal thrusts. Continue to give sets of five back blows and five abdominal thrusts until the object is dislodged and the person can cough forcefully speak or breathe, or until the person becomes unconscious.

Special Situations--If a victim is pregnant or the responder cannot fully reach around the victim, chest thrusts should be used instead of abdominal thrusts.

UNCONSCIOUS CHOKING

This sequence and choice of skills are reflected in the American Red Cross Unconscious Choking Algorithms ([Figures 6: Professional Rescuer](#); [Figure 7: Certified Lay Responder](#); and [Figure 8: Lay Community Responder](#)) and are based upon the review of the current science on care and education and the expert input of American Red Cross volunteers and professional staff.

If a responder checks the scene (Box 1) and the victim (Box 2), activates EMS (Box 3) and finds no signs of life (Box 4) and attempts 2 rescue breaths (Box 5) but the victim's chest does not rise, tilt the head farther back (Box A) and if needed care for unconscious choking.

Professional Rescuer--Give 5 Chest Thrusts (Box B) The rescuer's hands should be positioned in the center of the victim's chest, with the rescuer's dominant hand on bottom. The chest thrusts should be administered at a rate of 100 thrusts per minute. This is same hand position and technique as CPR.

Certified Lay Responder and Lay Community Responder--Give 30 Chest Compressions (Box B) The rescuer's hands should be positioned in the center of the victim's chest, with the rescuer's dominant hand on bottom. The chest compressions should be administered at a rate of 100 thrusts per minute.

Professional Rescuer and Certified Lay Responder and Lay Community Responder--Look Inside Victim's Mouth (Box E) Following the chest thrusts or compressions, the rescuer should quickly look inside the victim's mouth to see if there is any solid material visible in the airway. If an object is seen, the rescuer should remove the object with a finger (Box D). If no object is seen, or the object has been removed, the responder should proceed to attempt 2 rescue breaths (Box E).

If, upon giving 2 rescue breaths, the victim's chest clearly rises, Check for Signs of Life (Box 6).

If, upon giving 2 rescue breaths, the chest does not clearly rise, repeat cycles of chest thrusts or

compressions, look for an object, and then give 2 rescue breaths until the chest clearly rises.

RECOVERY POSITION

Responders should place a person in a recovery position if the victim is unconscious, is breathing effectively and there is no suspected head, neck or back injury (p. III-10). A responder can place a victim in a modified H.A.IN.E.S. recovery position if a head, neck or back injury is suspected and the responder *is unable to maintain* an open airway *or* has to leave to get help and/or an AED.

PART 4: CHILDREN AND INFANTS

INTRODUCTION

These interpretations which are based on the 2005 Consensus on Science with Treatment Recommendations (CoSTR), review of the current science on care and education and the expert input of American Red Cross volunteers and professional staff emphasize the most likely etiology of respiratory and cardiac emergencies in children and infants.

RECOGNITION AND EPIDEMIOLOGY OF CARDIAC EMERGENCIES

Unlike adults, children seldom initially suffer a cardiac emergency. Instead, they suffer a respiratory emergency that develops into a cardiac emergency. Motor vehicle crashes, drowning, smoke inhalation, poisoning, airway obstruction and falls are all common causes of respiratory emergencies that can develop into a cardiac emergency. A cardiac emergency can also result from an acute respiratory condition, such as a severe asthma attack. Less commonly, a cardiac emergency may occur due to congenital heart disease or from blunt impact to the chest (e.g., *commotio cordis*).

Cardiac emergencies are rare in an otherwise healthy infant. Cardiac emergencies in infants are usually preceded by trauma or a breathing emergency, like drowning or choking, or Sudden Infant Death Syndrome (SIDS). Infants born with genetic or congenital problems also might be at an increased risk for cardiac emergencies because of problems with their heart's structure or function.

CPR SEQUENCE FOR CHILDREN AND INFANTS

This sequence and choice of skills are reflected in the American Red Cross CPR/AED Algorithms ([Figures 9: Professional Rescuer](#); [Figure 10: Certified Lay Responder](#); and [Figure 11: Lay Community Responder](#)) and are based upon the 2005 CoSTR Universal Algorithm, review of the current science on care and education and the expert input of American Red Cross volunteers

and professional staff which has been adapted to meet the needs of the child or infant victim (p. III-3) (p. III-73).

NOTE: Responder levels are noted separately throughout this document where skill sequences or care steps are different between levels of responders.

CHECK THE SCENE FOR SAFETY (Box 1)

Once the responder has identified a potential emergency situation, the responder should check the scene (survey the scene or “scene size-up”) to make sure that it is safe for both the responder and the victim(s). Checking the scene involves scanning the area for the number of victims present, what may have happened and what help is available.

Responders should not move the victim(s) unless it is absolutely necessary for safety reasons (i.e. the scene is or becomes unsafe).

CHECK THE VICTIM (Box 2)

Once the responder has checked to see that the scene is safe, he or she should obtain consent from the parent or guardian of the child or infant, if present. Consent is implied in a life-threatening situation if a parent or guardian *is not present or immediately available*.

To check for responsiveness the responder should, tap the child's shoulder and shout, “Are you okay?” For an infant gently tap the shoulder or flick the insole of the infant's foot.

Responsive (Conscious)—If the child or infant responds, but is injured or needs medical care, someone should call 9-1-1 or the local emergency number and obtain whatever first aid supplies are available.

If trained, the responder should check the child or infant from toe to head. If the child is verbal briefly interview them to find what might be wrong. Responders should then give care based

on conditions found, and according to their level of training.

If alone and the child or infant does not have a life-threatening condition, leave the victim resting as comfortably as possible, activate EMS and return as quickly as possible. The victim's condition should be re-checked frequently.

Professional Rescuer—If the child or infant does not have any life-threatening conditions, a secondary assessment should be performed. This assessment includes interviewing the victim (if verbal) and bystanders while conducting a toe-to-head examination. Be sure to watch for changes in consciousness and breathing. Use the acronym S.A.M.P.L.E. to interview the victim (Signs or symptoms; Allergies; Medications; Pertinent past history; Last oral intake; and Events leading to the incident).

Unresponsive—If the child or infant *does not* respond immediately, someone should be asked to call 9-1-1 or the local emergency number. The responder should give care for the child or infant based on the conditions found.

Standard or BSI (body substance isolation) precautions should be taken to prevent disease transmission when giving care. This is done through using personal protective equipment (PPE), such as disposable gloves, protective eyewear and CPR breathing barriers (such as face shields and resuscitation masks.). It is also important to wash hands with soap and warm water immediately after giving care (even if disposable gloves were used).

CALL 9-1-1 OR THE LOCAL EMERGENCY NUMBER (Box 3)

Calling 9-1-1 or the local emergency number should be done for any life-threatening emergency (i.e., unconsciousness, breathing problems, chest pain or discomfort lasting more than 3-5 minutes or that goes away and comes back and for severe bleeding).

If two responders are present one should call 9-1-1 or the local emergency number and bring the AED

while the other responder continues the check and begins rescue breathing or CPR if needed.

The *lone responder* will have to decide to Call First or Care First based on the most likely cause of the child or infant's condition (i.e., cardiac or respiratory) (p. III-74).

Call First situations are those that are likely cardiac emergencies. The responder should call first if the unconscious child or infant is known to be at a high risk for cardiac emergencies or it is a *witnessed* sudden collapse of a child or infant. In call first situations, call 9-1-1 or the local emergency number before giving care.

Care First situations are more common in children and infants and are those that are likely due to respiratory (breathing) emergencies. These situations include *unwitnessed* collapse of an unconscious child or infant or any victim of a drowning. For care first situations, give care for about 2 minutes then call 9-1-1 or the local emergency number.

CHECK FOR SIGNS OF LIFE (Box 4)

If an unconscious child or infant is face-down, roll the victim face-up while supporting the head, neck and back. If possible, the child or infant should be on a firm, flat surface (p. III-10). The responder should then open the airway and look for movement and look, listen and feel for breathing for no more than 10 seconds using the methods described below.

OPEN THE AIRWAY

An open airway is essential. Do not tilt a child or infant's head back as far as an adult's head. For an infant the ideal position is neutral and for a child it varies with age from neutral to the hyperextend position of an adult. Children and infants' airways are more flexible than an adult's. Tilting the head back too far can close off the airway.

As with adults, studies have shown that the most effective method of opening the airway is the head tilt chin lift method. In addition, studies have shown that even professional rescuers move the

cervical spine when performing the modified jaw thrust. Furthermore, the modified jaw thrust does not consistently open the airway effectively. When taking the scientific information into account and understanding the establishing an open airway is of paramount importance the following approach to opening the airway has been established.

Professional Rescuer—To open the airway a head-tilt/chin-lift technique should be used. If there is a possible head, neck or back injury a jaw thrust maneuver can be performed. Because an open airway is a priority, if the rescuer cannot open and maintain the airway sufficiently using a jaw thrust, open the airway using the head-tilt/chin-lift technique (p. III-10).

Use manual in-line spinal stabilization rather than immobilization devices, for victims with suspected spinal injury (p. III-10).

Certified Lay Responder and Lay Community Responder—To open the airway use a head-tilt/chin-lift technique for a victim with or without a possible head, neck or back injury. The jaw-thrust technique is no longer recommended for the certified lay and the lay responder for the reasons previously explained.

CHECK FOR SIGNS OF LIFE

Checking for signs of life is defined as looking for movement and checking for breathing by looking (for the chest to rise and fall), listening (for the sounds of breathing) and feeling (for breaths on your skin) for no more than 10 seconds.

Signs of Life—If obvious signs of life are found give care, as needed, according to the responder's level of training. It is important to frequently re-check for signs of life as the condition of an unconscious child or infant may change rapidly.

No Signs of Life—If there are no signs of life as evidenced by an absence of breathing and movement, proceed to giving 2 rescue breaths (box 5).

GIVE 2 RESCUE BREATHS (Box 5)

To give a rescue breath tilt the head and lift the chin (for a child pinch the nose shut). Take a normal (not a deep) breath and make a complete seal around the child's mouth (or around an infant's mouth and nose) and blow just enough to make the chest clearly rise. Each rescue breath should last about one second and allow enough time for exhalation (p. III-7).

If the breaths do not make the chest rise, retilt the head and try the breaths again. If the second attempt to give breaths does not make the chest rise then care for the victim as an unconscious choking victim (See Unconscious Choking, Box B).

Professional Rescuer and Certified Lay Responder—If the breaths go in, check for a pulse (box 6) and provide care based on the conditions found. If the breaths do not go in, provide care for an unconscious choking victim.

Lay Community Responder—If the breaths go in begin chest compressions (box 7). If the breaths do not go in, provide care for an unconscious choking victim.

CPR BREATHING BARRIERS—FACE SHIELDS AND RESUSCITATION MASKS

Professional Rescuer—It is recommended that a resuscitation mask (pocket mask) be used during rescue breathing. Resuscitation masks are flexible, dome-shaped devices that fit over the victim's nose and mouth and allow you to breathe air into the victim's lungs without making mouth-to-mouth contact. The device can be connected to supplemental oxygen.

A Bag Valve Mask is another method of delivering rescue breaths without mouth to mouth contact while providing supplemental oxygen. Effective ventilations using a bag valve mask (BVM) is a challenging task and is most effective when it is provided by 2 rescuers. Ventilations provided with the use of a BVM should be provided in about 1-second, and with enough volume to make the chest clearly rise.

Certified Lay Responder—A face shield can be used; however, it is recommended that the responder switch to a resuscitation mask as soon as possible.

Lay Community Responder—If possible use a face shield for protection against disease transmission.

SPECIAL CIRCUMSTANCES

Mouth-to-Stoma--To give rescue breaths for a person with a stoma, the responder should look, listen and feel for breathing, placing his or her ear above the stoma. To give rescue breaths to this person, the responder should breathe into the stoma at the same rate as he or she would breathe into the victim's mouth, using mouth-to-stoma breathing or using a well-sealing, round pediatric resuscitation mask.(III-6). If possible pinch the nose and close the mouth as some patients with a stoma may still have a passage for air that reaches the mouth and nose in addition to the stoma.

Mouth-to-Nose—If unable to make a tight enough seal over the person's mouth, responders can breathe into the nose (p. III-6). With the victim's head tilted back, close the mouth by pushing on the chin. The responder should seal his or her mouth around the person's nose and breathe into the nose. If possible, open the person's mouth between rescue breaths to let the air out.

CHECK FOR A PULSE (Box 6)

For Professional Rescuer and Certified Lay Responders

Most pediatric emergencies are initially respiratory in nature, which necessitates teaching rescue breathing to professional rescuers and certified lay responders (including childcare providers and teachers). In order to teach rescue breathing, one must also teach an assessment that delineates when rescue breaths alone are needed and when to begin CPR. The best method to determine this is through a pulse check.

Finding a pulse is difficult for both professional rescuers and lay responders; and while determining when rescue breathing is needed is important in the child and infant, if a responder cannot find a definite pulse or is unsure whether a pulse is present within 10 seconds, begin CPR.

Performing chest compressions on a child or infant with a heartbeat will not be detrimental; the benefits outweigh the risks of not performing compressions when the heart is not beating.

Responders should check for a pulse for no more than 10 seconds and quickly scan for severe bleeding. For a child check the pulse by sliding your fingers toward yourself and down into the groove at the side of the child's neck then press in with a steady, but not too firm pressure. For an infant, find the brachial pulse on the *inside* of the upper arm, between the infant's elbow and shoulder.

RESCUE BREATHING (Box 6A)

For Professional Rescuer and Certified Lay Responders

If a child or infant is not breathing, but has a pulse begin rescue breathing. For a child or infant, rescue breathing should be given at a rate of 1 breath about every 3 seconds. After about 2 minutes (or 40 breaths) recheck for signs of life and a pulse for no more than 10 seconds. Care for the conditions found. As described earlier responders should use a barrier device which for professional rescuers can include a bag valve mask.

Professional Rescuer: Two-Rescuer Bag Valve Mask—for ventilating a nonbreathing child or infant. Providing effective ventilations using a bag valve mask is challenging and is most effective when 2 trained rescuers perform CPR. Provide ventilation using an appropriate pediatric BVM in about 1-second, and with enough volume to make the chest clearly rise , allowing sufficient time for exhalation..

If a child or infant is not breathing, rescuer 1 should assemble the BVM and position the mask so that it covers the victim's mouth and nose. Rescuer 2 can assist by sealing the mask and opening the airway. Begin ventilations by squeezing the bag slowly for about 1 second for a child or infant. Use enough force to make the chest clearly rise with each ventilation.

Professional Rescuer: One-Person Bag Valve Mask—It is not recommended that one person perform the BVM skill.

CHEST COMPRESSIONS (Box 7)

If a child or infant shows no sign of life and for the professional rescuer and certified lay responder has no pulse, begin cycles of 30 chest compressions and 2 breaths (cycles of 15 chest compressions and 2 breaths may be substituted if two professional rescuers are present) starting with chest compressions.

CHEST COMPRESSION TECHNIQUE

Correct chest compression technique is essential for quality CPR. Effective chest compressions provide a blood flow through the victim that delivers critical amounts of oxygen to the victim's brain and other vital organs. Chest compressions can also increase the likelihood that a shock delivered by an AED to a person suffering a sudden cardiac arrest (SCA) will be successful, especially if more than 4 minutes have elapsed since the victim's collapse.

Hand Placement—for a child the responder places one hand on the center of the chest and places the other hand over top. Studies using this technique showed an improved quality of chest compressions with shorter pauses between chest compressions and ventilations (p. III-7). It is acceptable depending of the size of the child and the size of the responder to use one or two hands to perform chest compressions (p. III-73 or p. III-75). For an infant the responder traces an imaginary line between the nipples and places two to three fingers along that line.

Compression Rate and Depth—Chest compressions should be given at a rate (or speed) of 100 compressions per minute for children and infants (p. III-8). When giving chest compressions on a child compress the chest about 1 to 1 ½ inches. For an infant compress the chest about ½ to 1 inch (p.III-8). Make sure to allow for full chest recoil after the compression by allowing the chest to return to its normal position before starting the next compression (p. III-8).

COMBINATION OF CHEST COMPRESSIONS AND RESCUE BREATHS

To help minimize interruption of chest compressions and to simplify the technique of CPR a ratio of 30 chest compressions and 2 rescue breaths should be used. This means that 1 cycle of CPR should include 30 chest compressions and 2 rescue breaths (p. III-9) (p. III-74 and 75).

Professional Rescuer: 2-Rescuer CPR—If 2 or more trained responders are available to give CPR, they should use a compression to ventilation ratio of 15:2. Rescuers should alternate between providing compressions and providing breaths after 10 cycles (or about 2 minutes of CPR) (p.III-74 and 75)

Professional Rescuer: 2-Rescuer Infant CPR—If 2 rescuers are or become available they should perform the 2-thumb-encircling hands chest compression technique with thoracic squeeze (p. III-75).

INTERRUPTING CPR

Professional Rescuers—Professional rescuers should continue CPR, without interruptions as long as possible, and attempt to limit any interruptions to no more than 10 seconds, except for specific interventions such as the insertion of an advanced airway or use of a defibrillator.

Certified Lay Responders and Lay Community Responders—Cycles of 30 chest compressions to 2 rescue breaths should be continued until an AED arrives and is ready to use, advanced medical help arrives and takes over, or the victim shows signs of life.

SPECIAL CIRCUMSTANCES

Compression-Only CPR—Compression only CPR can benefit persons suffering from cardiac arrest, but standard CPR, with rescue breaths is superior to compression only CPR. If a certified lay or lay community responder is unwilling, unable or untrained in full CPR, they should be encouraged to give continuous chest compressions once someone has activated the EMS system. (p. III-10 to 11) (p. III-74).

Professional Rescuer: 2-Rescuer CPR—If 2 or more trained rescuers are available to provide CPR, they should alternate turns of providing 5 cycles of chest compressions and 2 rescue breaths. Every 5 cycles (or about 2 minutes of CPR) responders should switch compressor and ventilator roles. When performing 2-person CPR responders should have a compression to ventilation ratio of 15:2 (p. III-74 and 75).

AUTOMATED EXTERNAL DEFIBILATOR (Box 8)

It is preferable to use an AED with a pediatric adapter. *Based on FDA approval of these devices in general, the pediatric adapters are designed for children less than 55 pounds.* If precise age or weight is not known, a care provider should use the appearance approach to age described previously for children (appearing older than an infant and younger the adolescent.). If a pediatric adapter is not available, one may use an AED designed for adults on a child. Always follow local protocols and manufacturer’s instructions

When an automated external defibrillator (AED) becomes available and ready, the responder should stop CPR and allow the AED to analyze the heart rhythm of the child.

If the AED advises that a shock is needed (there is a “shockable” rhythm, i.e., ventricular fibrillation or rapid ventricular tachycardia), the responder should follow the prompts to provide 1 shock, followed by 5 cycles (about 2 minutes) of CPR.

After 2 minutes of CPR, the AED may advise that no shock is needed. In that case, the responder should then resume CPR.

Use an AED as soon as it is available. This might mean stopping CPR before completing 5 cycles. If 2 persons are present, one responder should continue CPR while the other person prepares and attaches the AED.

Responders may be faced with using an AED that is not updated to the 2005 recommended shock

protocol. In that case, always follow the prompts of the AED that is being used.

CHOKING

Choking is a common breathing emergency. Common causes of choking in children and infants include trying to swallow large pieces of poorly chewed food; eating while talking excitedly or laughing; or eating too fast. A child or infant can easily swallow small objects (pebbles, coins, beads, parts of toys, balloons) or small pieces of food (hot dogs, grapes, popcorn or nuts), which can then block the airway. Walking, playing or running with food or objects in the mouth is also a cause of choking. Infants can also choke because their airway has not fully developed; and they are still developing their eating skills.

CONSCIOUS CHOKING

This sequence and choice of skills are reflected in the American Red Cross Conscious Choking Algorithm ([Figure 5](#)) and are based upon the review of the current science on care and education and the expert input of American Red Cross volunteers and professional staff.

If the child or infant is coughing forcefully, encourage continued coughing.

Because there is *no* evidence which technique is better and there is *clear* evidence that in many victims if one method does not work another method sometimes does, the technique for conscious choking will be a series of back blows and abdominal thrusts (p. III-6). In addition when you approach a child from the front, as taught, you are in a natural position to deliver back blows first and then move easily into position to give abdominal thrusts.

Conscious Choking—Child: If a child can not cough, speak or breathe the child is probably choking. The responder should take a position slightly behind the victim. Provide support by placing one arm diagonally across the chest and lean the child forward. Firmly strike the child between the shoulder blades with the heel of your other hand five times.

If back blows do not dislodge the object, give five abdominal thrusts. Continue to give a combination of 5 back blows and 5 abdominal thrusts until the object is forced out, the child can breathe, speak or cough forcefully or the child becomes unconscious.

Conscious Choking—Infant: An infant who can not cough, cry or breathe might be choking. Position the infant face-down on your forearm and support the infant's head and neck with your hand. Give 5 back blows between the infant's shoulder blades with the heel of your hand. Make each blow a separate and distinct attempt to dislodge the object.

If back blows do not dislodge the object, turn the infant over and give 5 chest thrusts. Place two or three fingers on the center of the breastbone, about one finger width below an imaginary line between the nipples. Continue until the object is forced out, the infant can breathe, cry or cough forcefully or the infant becomes unconscious.

Special Situations—if the responder cannot fully reach around a child, use chest thrusts instead of abdominal thrusts.

UNCONSCIOUS CHOKING

This sequence and choice of skills are reflected in the American Red Cross Unconscious Choking Algorithms ([Figures 6: Professional Rescuer](#); [Figure 8: Lay Community Responder](#); and [Figure 12: Certified Lay Community](#)) and are based upon the review of the current science on care and education and the expert input of American Red Cross volunteers and professional staff.

If a responder checks the scene (box 1) and the victim (box 2), activates EMS (box 3) and finds no signs of life (box 4) and attempts 2 rescue breaths (box 5) but the victim's chest does not rise proceed to re-position the airway (Box A) and if needed caring for unconscious choking.

Professional Rescuer—if the chest does not clearly rise on the 2 rescue breaths, re-position the head and try 2 more rescue breaths (box A). If during the second attempt the rescue breaths do not make the chest clearly rise, begin a modified CPR technique.

Give 5 chest thrusts (Box B), followed by looking in the victim's mouth (Box C) and removing any objects seen with a finger sweep (Box D). Repeat the cycle of breaths, compressions and mouth check until two effective breaths are achieved.

Certified Lay Responder and Lay Community Responder—if the chest does not clearly rise when attempting the 2 rescue breaths, re-position the head and try 2 more rescue breaths (box B). If the rescue breaths still do not make the chest clearly rise, begin a modified CPR technique.

Give 30 chest compressions (Box B), followed by a look in the victim's mouth (Box C) and removing any object seen using a finger (Box D); then try 2 rescue breaths (Box E). Repeat this cycle of 30 compressions, mouth check and breaths until the chest clearly rises when giving rescue breaths; EMS arrives and takes over; you are too exhausted to continue; or an obvious sign of life returns.

RECOVERY POSITION

Responders should place a person in a recovery position if the victim is unconscious, is breathing effectively and there is no suspected head, neck or back injury (p. III-10). A responder can place a victim in a modified H.A.IN.E.S. recovery position if a head, neck or back injury is suspected and the responder *is unable to maintain* an open airway *or* has to leave to get help and/or an AED.

Figure 2: American Red Cross Professional Rescuer [Level 1] Adult CPR/AED Algorithm

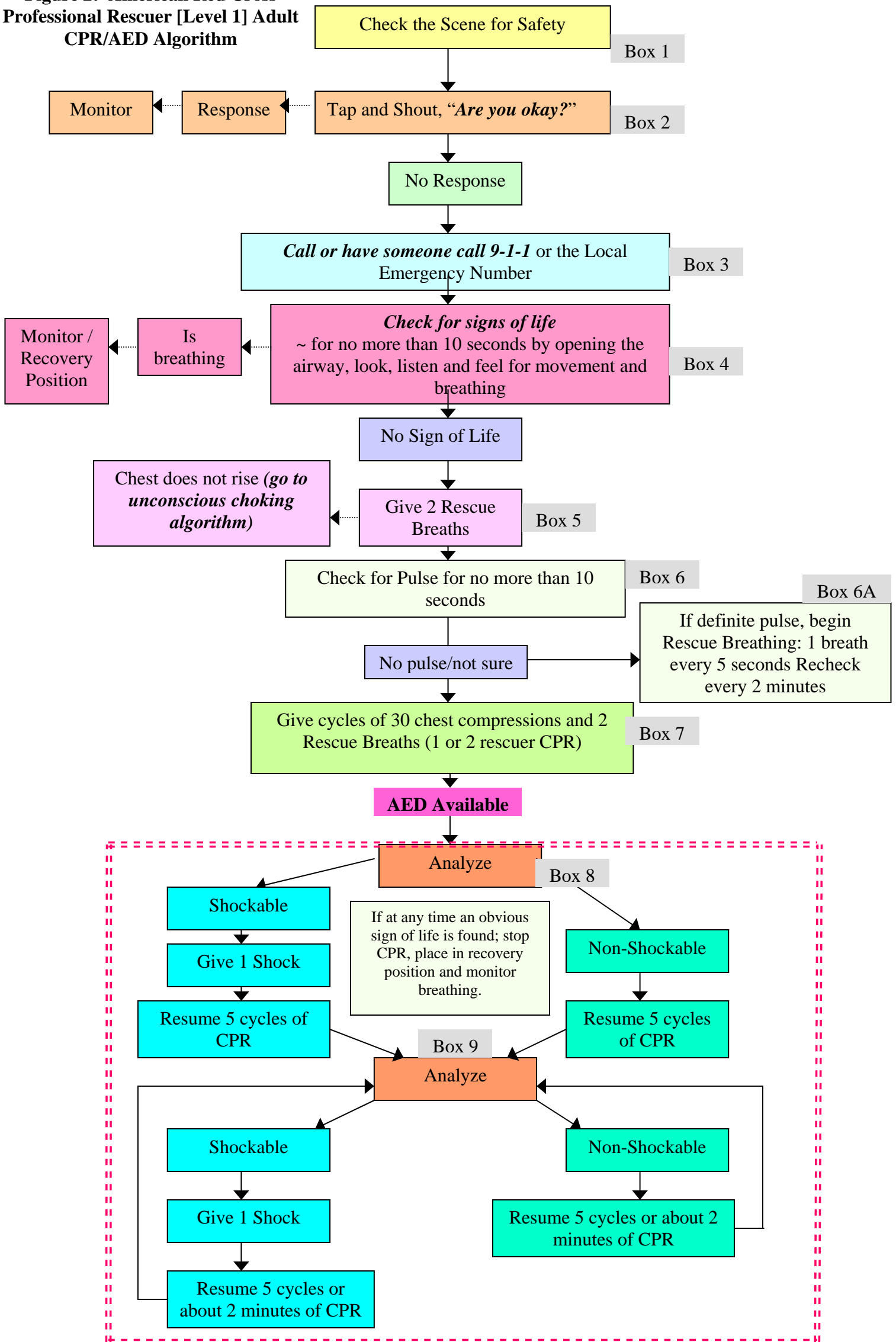


Figure 3: American Red Cross Certified Lay Responder [Level 2] Adult CPR/AED Algorithm

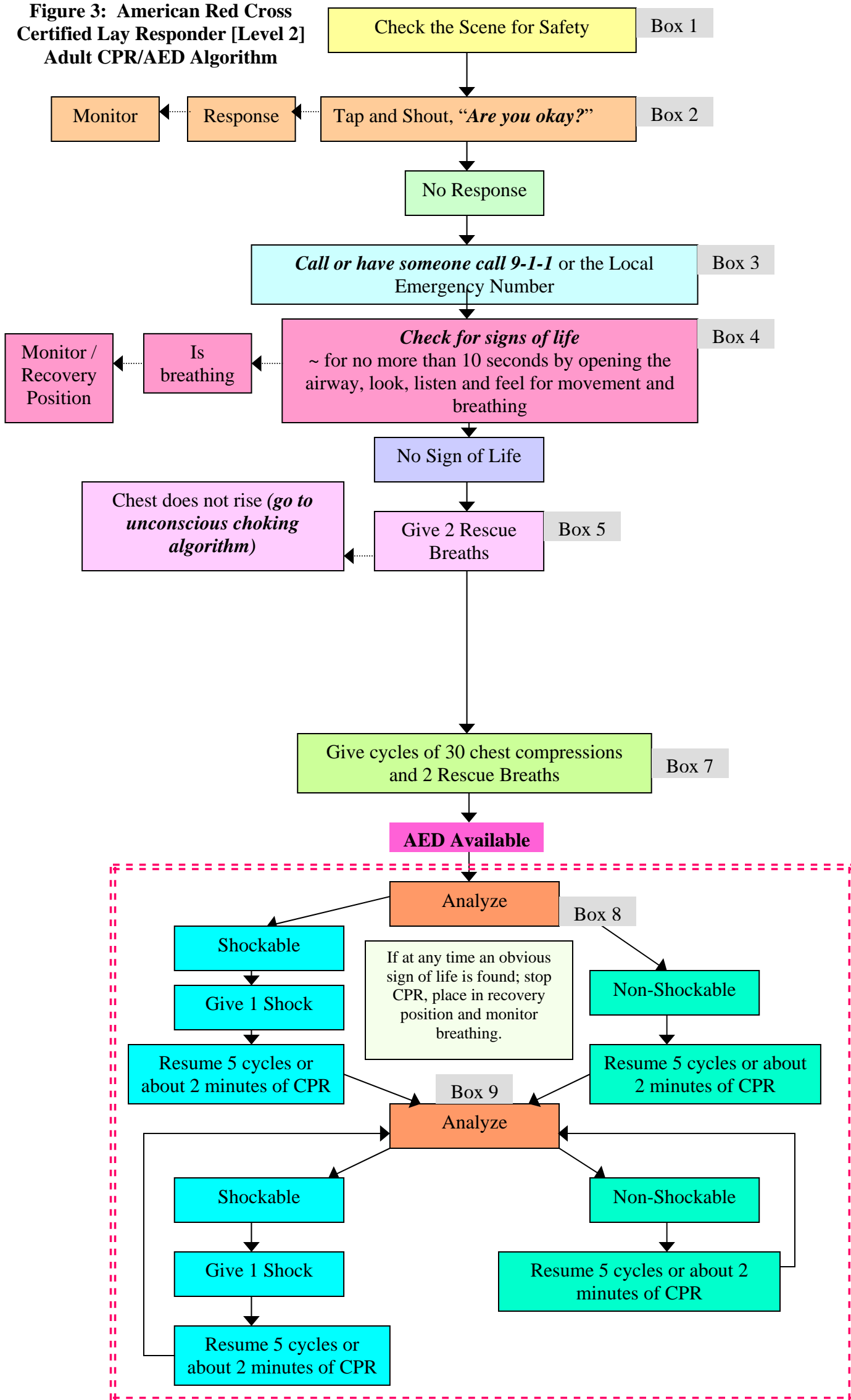


Figure 4: American Red Cross Lay Community Responder [Level 3] Adult CPR/AED Algorithm

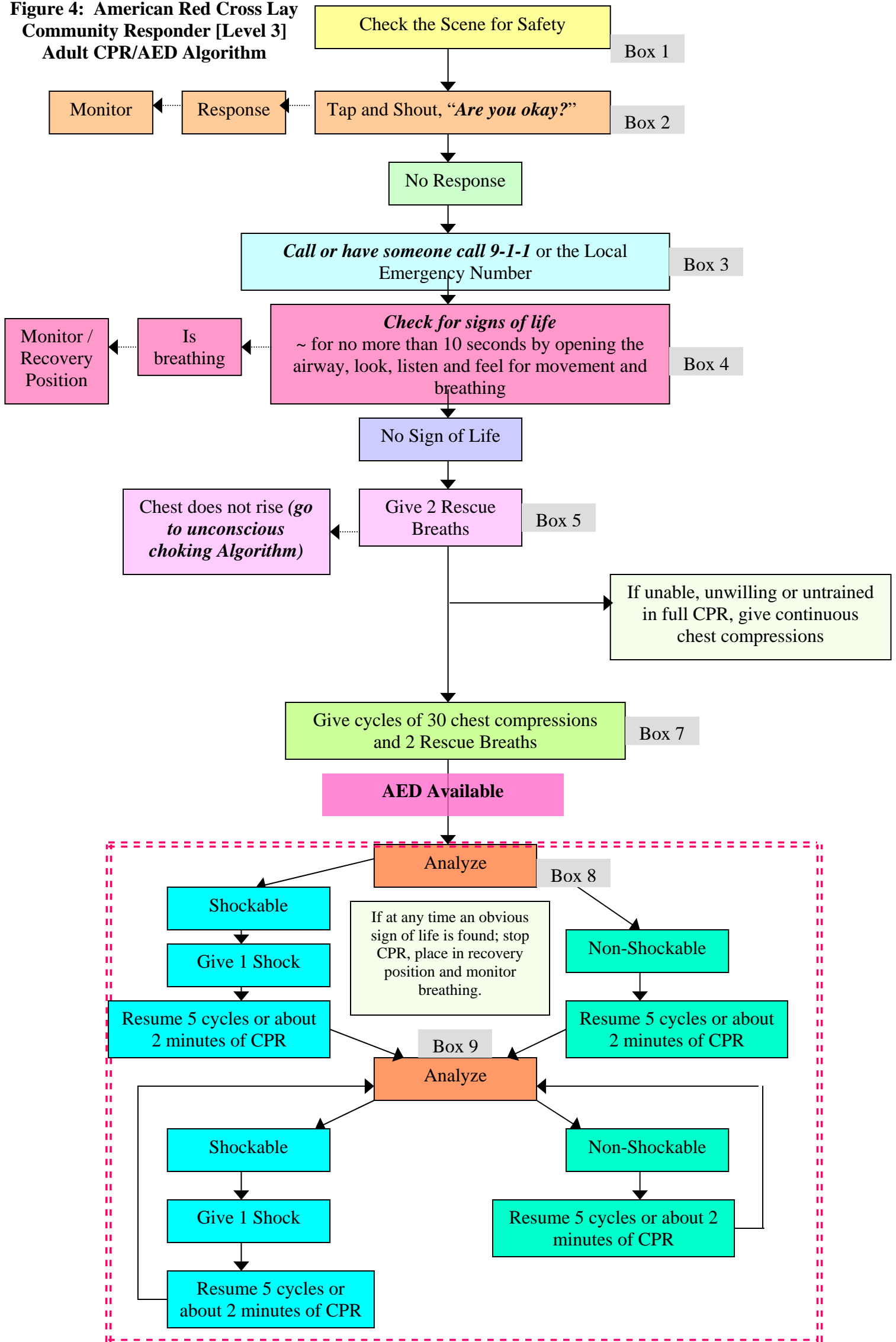


Figure 5: American Red Cross Professional Rescuer [Level 1], Certified Lay Responder [Level 2] and Lay Community Responder [Level 3] Adult, Child or Infant Conscious Choking Algorithm

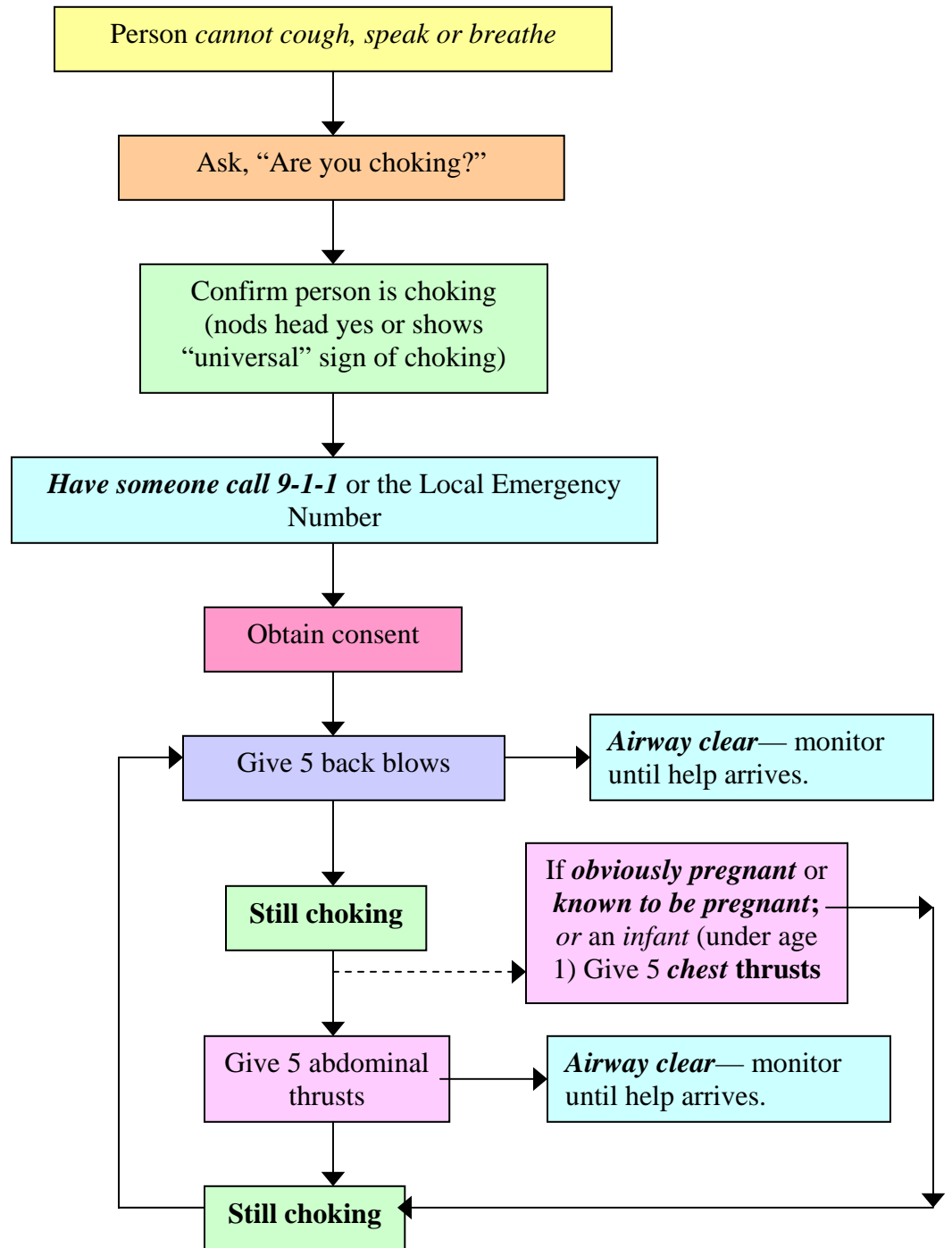


Figure 6: American Red Cross Professional Rescuer [Level 1] Adult/Child/Infant Unconscious Choking Algorithm

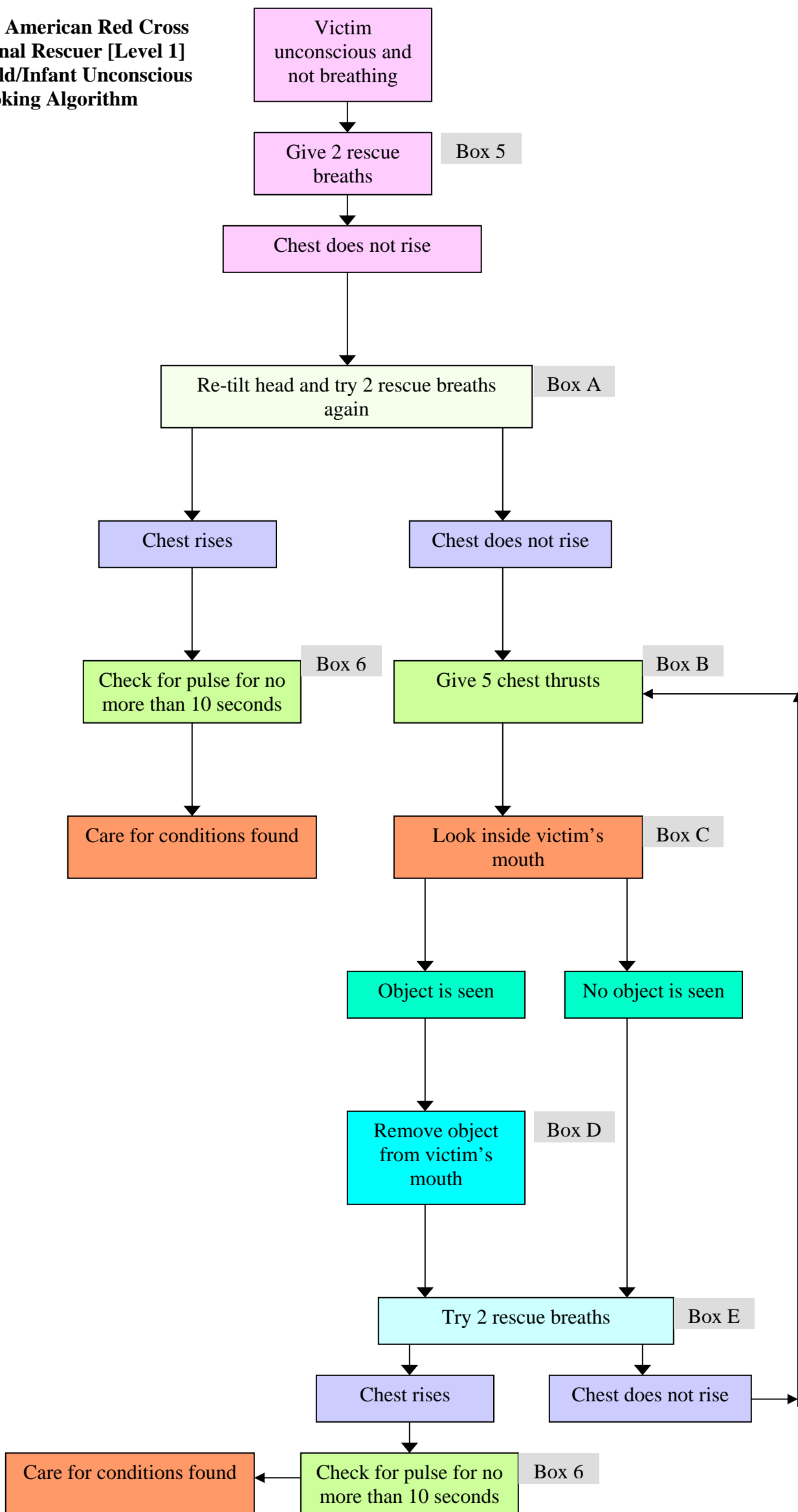


Figure 7: American Red Cross Certified Lay Responder [Level 2] Adult Unconscious Choking Algorithm

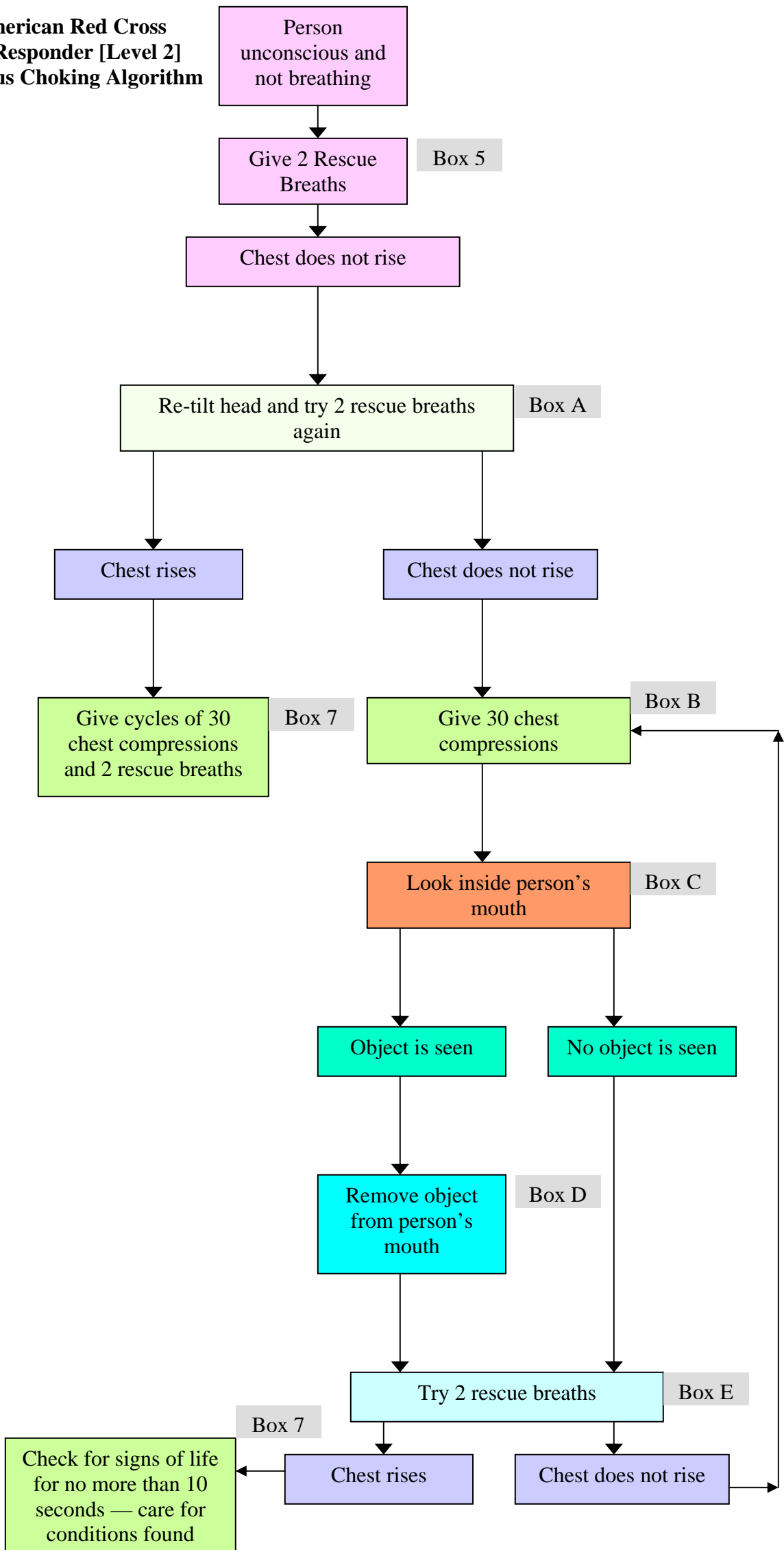


Figure 8: American Red Cross Lay Community Responder [Level 3] Adult/Child/Infant Unconscious Choking Algorithm

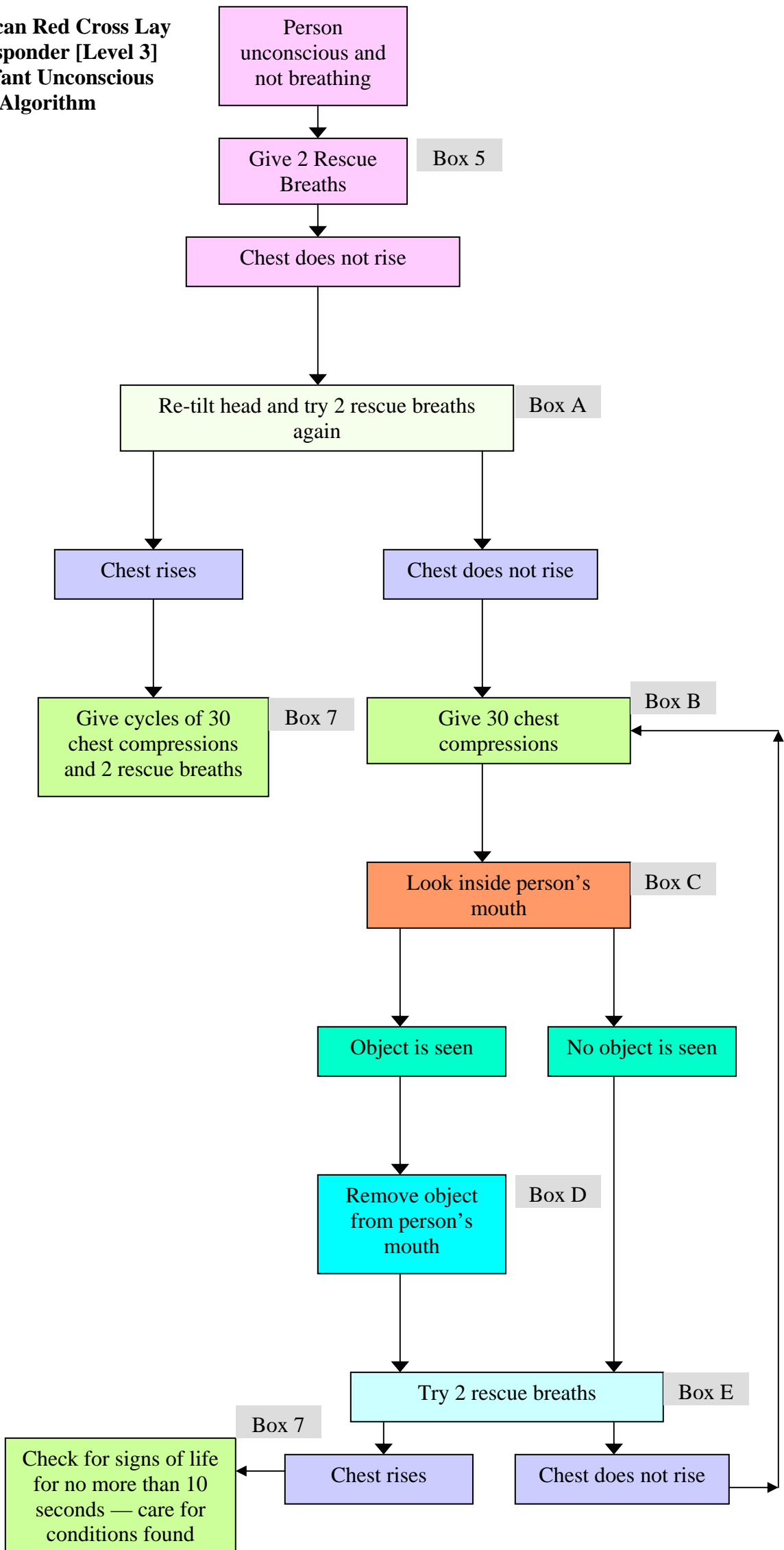


Figure 9: American Red Cross Professional Rescuer [Level 1] Child/Infant CPR/AED Algorithm

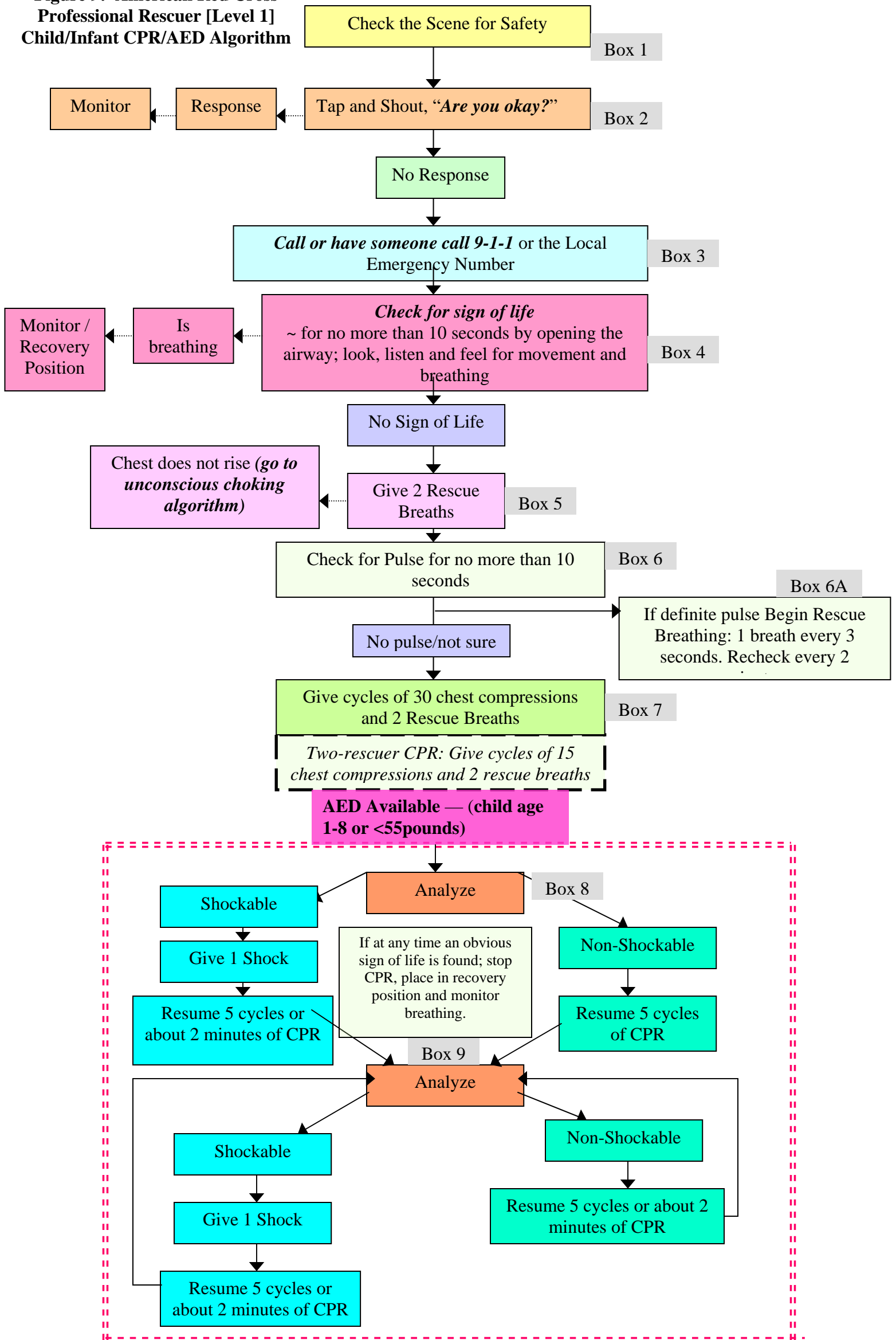


Figure 10: American Red Cross Certified Lay Responder [Level 2] Child/Infant CPR/AED Algorithm

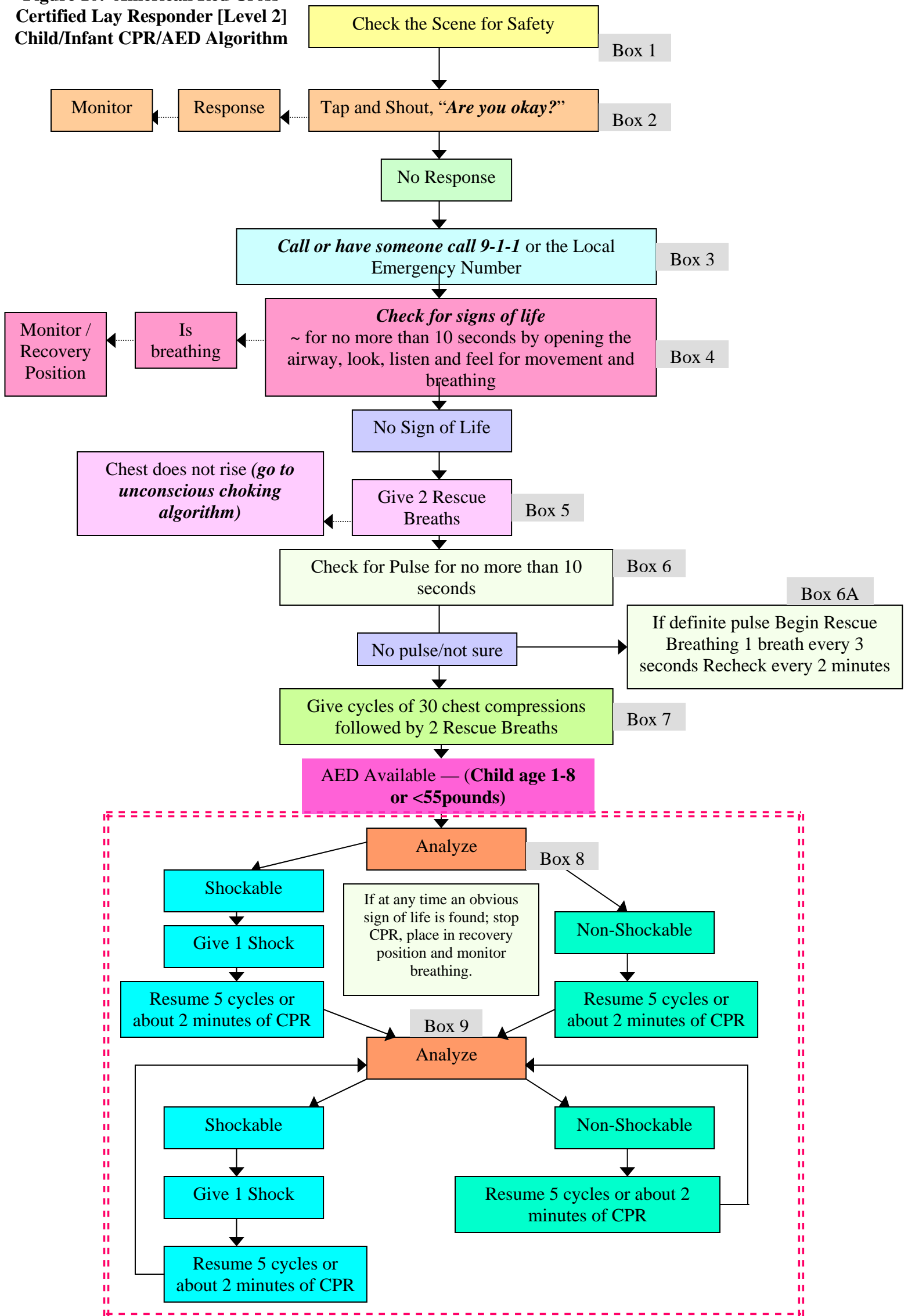


Figure 11: American Red Cross Lay Community Responder [Level 3] Child/Infant CPR Algorithm

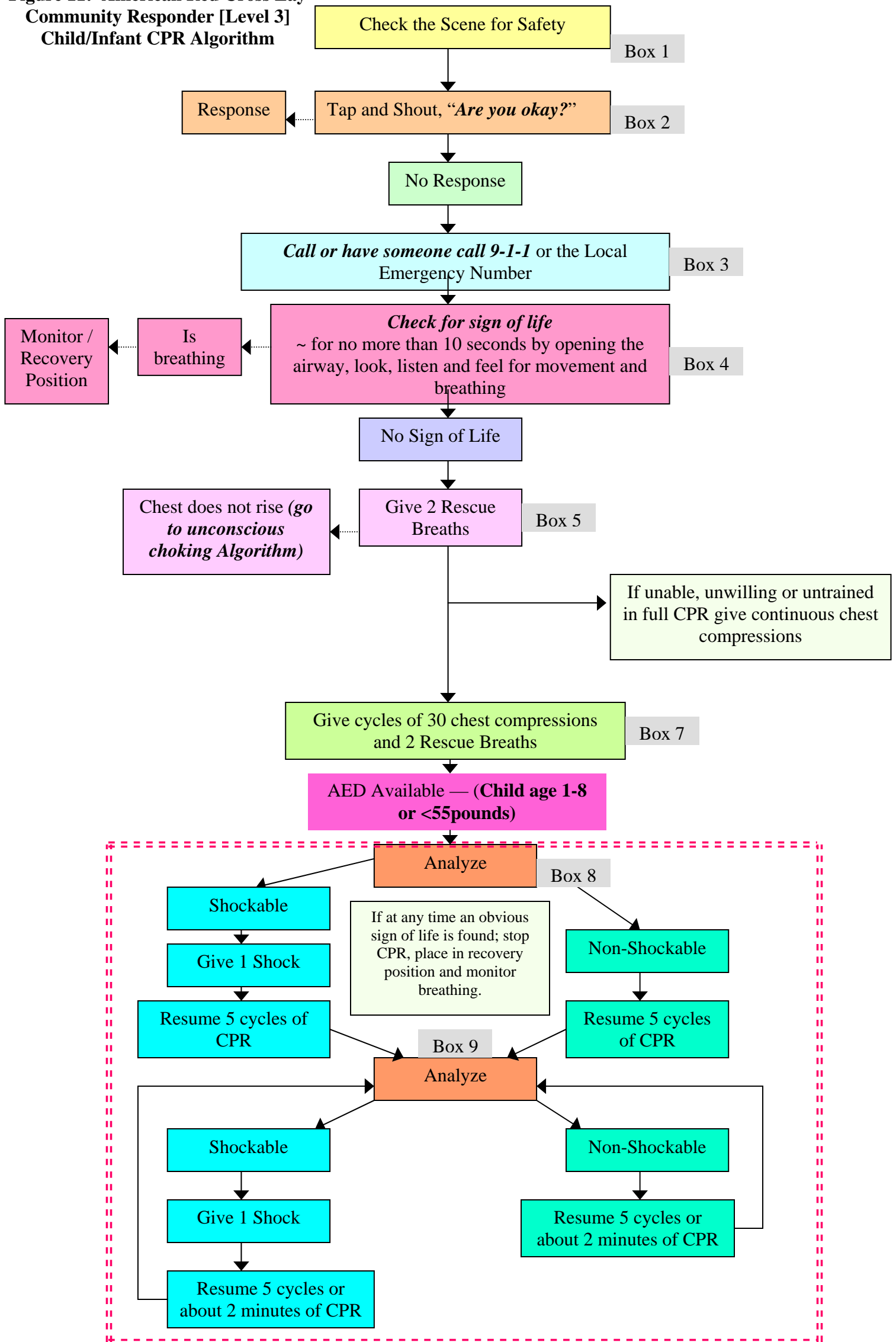


Figure 12: American Red Cross Certified Lay Responder [Level 2] Child/Infant Unconscious Choking Algorithm

