ACLS Provider Manual
Comparison Sheet
Based on *2010 AHA Guidelines for CPR and ECC*

BLS Changes			
	New	**Old**	**Rationale**
CPR	Chest compressions, Airway, Breathing (C-A-B) New science indicates the following order: 1. Check the patient for responsiveness and no breathing. 2. Call for help and get the AED 3. Check the pulse. 4. Give 30 compressions. 5. Open the airway and give 2 breaths. 6. Resume compressions.	Airway, Breathing, Chest compressions (A-B-C) Previously, after responsiveness was assessed, a call for help was made, the airway was opened, the patient was checked for breathing, and 2 breaths were given, followed by a pulse check and compressions.	Although ventilations are an important part of resuscitation, evidence shows that compressions are the critical element in adult resuscitation. In the A-B-C sequence, compressions are often delayed.
	Compressions should be initiated within 10 seconds of recognition of the arrest.	Compressions were to be given after airway and breathing were assessed, ventilations were given, and pulses were checked.	Although ventilations are an important part of resuscitation, evidence shows that compressions are the critical element in adult resuscitation. Compressions are often delayed while providers open the airway and deliver breaths.
	Compressions should be given at a rate of at least 100/min. Each set of 30 compressions should take approximately 18 seconds or less.	Compressions were to be given at a rate of about 100/min. Each cycle of 30 compressions was to be completed in 23 seconds or less.	Faster compressions are required to generate the pressures necessary to perfuse the coronary and cerebral arteries.
	Compression depths are as follows: • Adults: **at least** 2 inches (5 cm) • Children: **at least** one third the depth of the chest, approximately 2 inches (5 cm) • Infants: **at least** one third the depth of the chest, approximately 1½ inches (4 cm)	Compression depths were as follows: • Adults: 1½ to 2 inches • Children: one third to one half the diameter of the chest • Infants: one third to one half the diameter of the chest	Deeper compressions are required to generate the pressures necessary to perfuse the coronary and cerebral arteries.

Airway and Breathing	Cricoid pressure is no longer routinely recommended for use with ventilations.	If an adequate number of rescuers was available, one could apply cricoid pressure.	Randomized studies have demonstrated that cricoid pressure still allows for aspiration. It is also difficult to properly train providers to perform the maneuver correctly.
	"Look, listen, and feel for breathing" has been removed from the sequence for assessment of breathing after opening the airway. Healthcare providers briefly check for breathing when checking responsiveness to detect signs of cardiac arrest. After delivery of 30 compressions, lone rescuers open the victim's airway and deliver 2 breaths.	"Look, listen, and feel for breathing" was used to assess breathing after the airway was opened.	With the new chest compression–first sequence, CPR is performed if the adult victim is unresponsive and not breathing or not breathing normally (ie, not breathing or only gasping) and begins with compressions (C-A-B sequence). Therefore, breathing is briefly checked as part of a check for cardiac arrest. After the first set of chest compressions, the airway is opened and the rescuer delivers 2 breaths.
AED Use	For children from 1 to 8 years of age, an AED with a pediatric dose-attenuator system should be used if available. If an AED with a dose attenuator is not available, a standard AED may be used. For infants (<1 year of age), a manual defibrillator is preferred. If a manual defibrillator is not available, an AED with a pediatric dose attenuator is desirable. If neither is available, an AED without a dose attenuator may be used.	This does not represent a change for the child. In 2005 there was not sufficient evidence to recommend for or against the use of an AED in infants.	The lowest energy dose for effective defibrillation in infants and children is not known. The upper limit for safe defibrillation is also not known, but doses >4 J/kg (as high as 9 J/kg) have provided effective defibrillation in children and animal models of pediatric arrest, with no significant adverse effects. AEDs with relatively high energy doses have been used successfully in infants in cardiac arrest, with no clear adverse effects.

ALS Changes

	New	Old	Rationale
Airway and Breathing	Continuous quantitative waveform capnography is now recommended for intubated patients throughout the periarrest period. When quantitative waveform capnography is used for adults, applications now include recommendations for confirming endotracheal tube placement and for monitoring CPR quality and detecting ROSC based on end-tidal carbon dioxide (P_{ETCO_2}) values.	An exhaled carbon dioxide detector or an esophageal detector device was recommended to confirm endotracheal tube placement. The *2005 AHA Guidelines for CPR and ECC* noted that P_{ETCO_2} monitoring could be useful as a noninvasive indicator of cardiac output generated during CPR.	Continuous waveform capnography is the most reliable method of confirming and monitoring correct placement of an endotracheal tube. Although other means of confirming endotracheal tube placement are available, they are not more reliable than continuous waveform capnography. Providers should observe a persistent capnographic waveform with ventilation to confirm and monitor endotracheal tube placement.

	Once circulation is restored, arterial oxyhemoglobin saturation should be monitored. It may be reasonable, when the appropriate equipment is available, to titrate oxygen administration to maintain the arterial oxyhemoglobin saturation ≥94%.	No specific information about weaning the patient off supplementary oxygen was provided.	In effect, the oxyhemoglobin saturation should be maintained at 94% to 99% when possible. Although the ACLS Task Force of the 2010 International Consensus on CPR and ECC Science With Treatment Recommendations did not find sufficient evidence to recommend a specific weaning protocol, a recent study documented harmful effects of hyperoxia after ROSC.
	Supplementary oxygen is not needed for patients without evidence of respiratory distress or when oxyhemoglobin saturation is ≥94%.	Oxygen was recommended for all patients with overt pulmonary edema or arterial oxyhemoglobin saturation <90%. It was also reasonable to administer oxygen to all patients with ACS for the first 6 hours of therapy.	Emergency medical services providers administer oxygen during the initial assessment of patients with suspected ACS. However, there is insufficient evidence to support its routine use in uncomplicated ACS. If the patient is dyspneic, is hypoxemic, or has obvious signs of heart failure, providers should titrate oxygen therapy to maintain oxyhemoglobin saturation ≥94%.
Pharma-cology	Atropine is not recommended for routine use in the management of PEA/asystole and has been removed from the ACLS Cardiac Arrest Algorithm. The treatment of PEA/asystole is now consistent in the ACLS and pediatric advanced life support recommendations and algorithms.	Atropine was included in the ACLS Pulseless Arrest Algorithm: for a patient in asystole or slow PEA, atropine could be considered.	There are several important changes regarding the management of symptomatic arrhythmias in adults. Available evidence suggests that the routine use of atropine during PEA or asystole is unlikely to have a therapeutic benefit. For this reason, atropine has been removed from the Cardiac Arrest Algorithm.
	Adenosine is recommended in the initial diagnosis of stable, undifferentiated, regular, monomorphic, wide-complex tachycardia. It should not be used if the pattern is irregular.	In the Tachycardia Algorithm, adenosine was recommended only for suspected regular, narrow-complex reentry supraventricular tachycardia.	On the basis of new evidence of safety and potential efficacy, adenosine can now be considered in the initial assessment and treatment of undifferentiated regular, monomorphic, wide-complex tachycardia when the rhythm is regular.
	For the treatment of adults with symptomatic and unstable bradycardia, chronotropic drug infusions are recommended as an alternative to pacing.	In the Bradycardia Algorithm, chronotropic drug infusions were listed in the algorithm after atropine and while awaiting a pacer or if pacing was ineffective.	For symptomatic or unstable bradycardia, intravenous infusion of chronotropic agents is now recommended as an equally effective alternative to external transcutaneous pacing when atropine is ineffective.
	Morphine should be given with caution to patients with unstable angina.	Morphine was the analgesic of choice for pain unresponsive to nitrates, but it was not recommended for use in patients with	Morphine is indicated in STEMI when chest discomfort is unresponsive to nitrates. Morphine should be used with caution in

		possible hypovolemia.	unstable angina/non-STEMI, because morphine administration was associated with increased mortality in a large registry.
Defibrilla-tion	The recommended initial biphasic energy dose for cardioversion of atrial fibrillation is 120 to 200 J. The initial monophasic dose for cardioversion of atrial fibrillation is 200 J. Cardioversion of adult atrial flutter and other supraventricular rhythms generally requires less energy; an initial energy of 50 to 100 J with either a monophasic or a biphasic device is often sufficient. If the initial cardioversion shock fails, providers should increase the dose in a stepwise fashion.	The recommended initial monophasic energy dose for cardioversion of atrial fibrillation was 100 to 200 J. Cardioversion with biphasic waveforms was available, but the optimal doses for cardioversion with biphasic waveforms had not been established with certainty. Extrapolation from published experience with elective cardioversion of atrial fibrillation with the use of rectilinear and truncated exponential waveforms supported an initial dose of 100 to 120 J with escalation as needed. This initial dose has been shown to be 80% to 85% effective in terminating atrial fibrillation. Until further evidence becomes available, this information can be used to extrapolate biphasic cardioversion doses to other tachyarrhythmias.	The writing group reviewed interim data on all biphasic studies conducted since the *2005 AHA Guidelines for CPR and ECC* were published and made minor changes to update cardioversion dose recommendations. A number of studies attest to the efficacy of biphasic waveform cardioversion of atrial fibrillation with energy settings from 120 to 200 J, depending on the specific waveform.
	Adult stable monomorphic VT responds well to monophasic or biphasic waveform cardioversion (synchronized) shocks at initial energies of 100 J. If there is no response to the first shock, it may be reasonable to increase the dose in a stepwise fashion. No interim studies were found that addressed this rhythm, so the recommendations were made by writing group expert consensus.	There was insufficient evidence to recommend a biphasic dose for cardioversion of monomorphic VT. The *2005 AHA Guidelines for CPR and ECC* recommended use of an unsynchronized shock for treatment of the unstable patient with polymorphic VT.	The writing group agreed that it would be helpful to add a biphasic dose recommendation to the *2010 AHA Guidelines for CPR and ECC* for cardioversion of monomorphic VT but wanted to emphasize the need to treat polymorphic VT as unstable and as an arrest rhythm.

Algorithm Update	The conventional ACLS Cardiac Arrest Algorithm has been simplified and streamlined to emphasize the importance of high-quality CPR (including providing compressions of adequate rate and depth, allowing complete chest recoil after each compression, minimizing interruptions in chest compressions, and avoiding excessive ventilation) and the fact that ACLS actions should be organized around uninterrupted periods of CPR. A new circular algorithm has also been introduced.	The same priorities were cited in the *2005 AHA Guidelines for CPR and ECC*. The box-and-arrow algorithm listed key actions performed during the resuscitation in a sequential fashion.	For the treatment of cardiac arrest, ACLS interventions build on the BLS foundation of high-quality CPR to increase the likelihood of ROSC. Before 2005, ACLS courses assumed that excellent CPR was provided, and they focused mainly on added interventions of manual defibrillation, drug therapy, and advanced airway management, as well as alternative and additional management options for special resuscitation situations. Although adjunctive drug therapy and advanced airway management are still part of ACLS, in 2005 the emphasis in advanced life support returned to the basics, with an increased emphasis on what is known to work: high-quality CPR (providing compressions of adequate rate and depth, allowing complete chest recoil after each compression, minimizing interruptions in chest compressions, and avoiding excessive ventilation). The *2010 AHA Guidelines for CPR and ECC* continue this emphasis. The *2010 AHA Guidelines for CPR and ECC* note that ideally CPR is guided by physiologic monitoring and includes adequate oxygenation and early defibrillation while the ACLS provider assesses and treats possible underlying causes of the arrest. There is no definitive clinical evidence that early intubation or drug therapy improves neurologically intact survival to hospital discharge.