

2005 Heart and Stroke Foundation of Canada Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care: Comparison chart of key changes

2005 Recommendation	2000 Recommendation	Explanation
Basic Life Support		
Increased emphasis on delivery of effective chest compressions	Emphasized the first three links in the Chain of Survival: early access, early CPR, and early defibrillation. Stated early CPR significantly improved survival. Named early defibrillation as the single greatest determinant of survival for adult victims of cardiac arrest.	<p>When chest compressions are interrupted, blood flow stops. Limiting interruptions to chest compressions will result in greater survival.</p> <p>In any given series (cycle) of chest compressions, earlier compressions are less effective than later ones. Therefore, fewer interruptions increase the percentage of effective chest compressions.</p> <p>Allowing the chest wall to fully “recoil” or return to its normal position between compressions results in better re-filling of blood in the heart, which then results in more blood available to be pumped to the rest of the body during the next compression.</p>
Single CPR compression-to-ventilation ratio: 30:2 for all rescuers responding alone to victims of any age, except newborns	A compression to ventilation ratio of 15 to 2 was recommended for adult CPR; a ratio of 5 to 1 for child and infant CPR.	<p>A single ratio will make learning the correct procedure for responding to all ages of victims easier and increase the likelihood that a rescuer will remember the steps of CPR during an emergency.</p> <p>The new ratio also reduces interruptions in chest compressions (see explanation above).</p>
AED programs in public locations where there’s a relatively high likelihood of witnessed cardiac arrest (eg, airports, casinos, sports facilities and businesses) are recommended.	The key elements of successful AED programs included healthcare provider oversight, training of likely rescuers, link to local EMS system and process of continuous quality improvement.	<p>Some AEDs do not require a prescription, so healthcare provider oversight of AED programs is not mandatory.</p> <p>The Public Access Defibrillation trial reinforced the importance of planned and practiced response. Lay rescuer programs in airports and casinos and by police officers have reported survival rates as high as 49 percent to 74 percent when responding to sudden cardiac arrest caused by ventricular fibrillation.</p>

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A single shock from a defibrillator, followed by immediate CPR for two minutes, beginning with chest compressions, should be used to treat cardiac arrest caused by ventricular fibrillation (VF-the abnormal heart rhythm responsible for most cardiac arrests).	Up to three shocks in a series were recommended to treat cardiac arrest with a “shockable” rhythm before returning to chest compressions for one minute; the heart rhythm was evaluated before and after each shock.	Repeated cycles of rhythm analysis and shock result in delays of up to 37 or more seconds before the first post-shock chest compressions are delivered. Most defibrillators eliminate VF more than 85 percent of the time. If the first shock fails, immediate CPR (before trying another shock) is likely to contribute to the success of a subsequent shock. Even when a shock eliminates VF, it may take several minutes for the heart to pump blood effectively, even if a normal heart rhythm returns. A brief period of chest compressions can deliver oxygen to the heart during this post-shock period, increasing the likelihood that the heart will begin to effectively pump blood on its own.
After giving two rescue breaths, lay rescuers no longer check for signs of circulation before beginning chest compressions.	After giving two rescuer breaths, lay rescuers were instructed to check for signs of circulation (normal breathing, coughing or movement). Lay rescuers gave rescue breathing without chest compressions to victims with signs of circulation who were not breathing normally.	Lay providers cannot reliably detect the presence of circulation in a victim. Great harm can be done when rescuers <i>don't</i> do chest compressions when they're needed. Relatively minimal harm can be done by providing chest compressions when they <i>aren't</i> needed. Therefore, the new guidelines do <i>not</i> recommend that lay rescuers look for “signs of circulation” before delivering chest compressions. This eliminates the chance that lay rescuers might not recognize true cardiac arrest, and reduces delays to chest compressions. Eliminating instructions to look for signs of circulation and for delivering “rescue breathing without chest compressions” reduces the number of skills required for lay rescuers. This makes it more likely that the lay provider will learn and remember the steps of CPR.
Dispatchers should be trained to recognize the symptoms of Acute Coronary Syndromes (ACS), and advise patients with symptoms of ACS without history of aspirin allergy or gastrointestinal bleeding to chew 160 mg – 325 mg of aspirin while awaiting the arrival of EMS providers.	Dispatchers were not instructed to recognize ACS or recommend aspirin.	Early administration of aspirin has been associated with decreased mortality rates in several clinical trials. Many studies have demonstrated the safety of aspirin administration.

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Advanced Cardiac Life Support		
Basic Life Support (BLS) skills are the priority in treating cardiac arrest. Providers must minimize interruptions to chest compressions.		See explanations above
If an advanced airway is required, a laryngeal mask airway, esophageal-tracheal double-lumen tube, and tracheal tube are equally acceptable	When a tracheal tube is not available, a laryngeal mask airway or esophageal-tracheal double-lumen tube are preferable to bag-mask ventilation	Studies comparing laryngeal mask airway or esophageal-tracheal double-lumen tube to tracheal tube shows that any of these devices can provide adequate ventilation in a cardiac arrest and each of these devices have their advantages and disadvantages. It is important to have a backup plan for ventilation when your preferred method is unsuccessful
When an advanced airway is used, ventilations should be provided at a maximum rate of 8-10 per minute	When an advanced airway is used, ventilations should be provided at a rate of 10-12 per minute	There are significant negative effects of hyperventilation. A maximum of 10 ventilations per minute will provide sufficient oxygen without the risk of hyperventilation.
Give vasopressor if indicated after one unsuccessful shock followed by 2 minutes of CPR if still no perfusing rhythm	Give vasopressor if indicated after a series of stacked shocks and a pulse and rhythm check.	While there is animal evidence that vasopressors improve myocardial electrical activity there is no evidence that outcome in humans is affected. Coupled with the evidence that delaying and interrupting CPR reduces its effectiveness, resuming CPR and avoiding interruptions is the priority.
Consider anti-arrhythmic after a 2nd unsuccessful shock followed by 2 minutes of CPR if still in VF	Consider anti-arrhythmic after unsuccessful stacked shock series and second unsuccessful shock if still in VF	Interrupting CPR to check the rhythm so that an antiarrhythmic can be given cannot be justified without evidence that antiarrhythmic treatment increases the rate of survival to hospital discharge.
Treatment of stable tachycardia out-of-hospital should be limited to vagal maneuvers or adenosine. Treatment of stable wide-complex tachycardia should be deferred until the patient is in hospital.	Stable tachycardia was treated according to a complex algorithm requiring accurate diagnosis of the rhythm and estimation of ejection fraction	Overwhelming feedback from healthcare providers suggested that the stable tachycardia treatment algorithm was too difficult to follow. There is no evidence that a STABLE tachycardia benefits from out-of-hospital treatment and there is a risk to providing an incorrect treatment. Vagal maneuvers and adenosine are indicated for easily identified narrow-complex rhythms and are low risk treatments which if successful, will provide symptom relief. Other diagnosis and treatment should be delayed until hospital where expert consultation can be obtained if required.

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Atropine may be considered for brady-asystolic arrest	Atropine was recommended for all forms of asystole	Five prospective controlled nonrandomized cohort studies in adults showed that treatment with atropine was not associated with any consistent benefits after in-hospital or out-of-hospital cardiac arrest.
Fibrinolysis should be considered during cardiac arrest when pulmonary embolism is suspected or when acute thrombotic etiology is suspected in initially failed resuscitation	No recommendation	Adults have been successfully resuscitated following administration of fibrinolytics after initial failure of standard CPR techniques, particularly when the condition leading to the arrest was acute pulmonary embolism or other presumed cardiac cause
CPR should be resumed immediately after a shock. Rhythm and pulse should not be checked until 2 minutes of CPR are provided.	CPR was not resumed until a rhythm and pulse were checked, and then CPR was continued for 1 minute until a rhythm and pulse were checked again.	Research shows that pulse and rhythm checks after a shock delay CPR for up to 15 seconds. This interruption in circulation is detrimental to 4 of 5 cardiac arrest victims. For the 1 in 5 victims who are shocked in to a perfusing rhythm, research suggests that when a pulse check is done, it is only detected in 2.5% of patients. Compressions in this group of victims are not detrimental and may be beneficial.
Post-resuscitation stabilization requires support of vital organs, with the anticipation of post-resuscitation heart dysfunction. Some reliable prognostic indicators have been reported.	No specific neurologic signs indicated the potential for successful resuscitation.	New research suggests there are specific clinical signs that correlate strongly with death or poor brain function following resuscitative efforts.
Unconscious adult patients with return of spontaneous circulation after out-of-hospital cardiac arrest should be cooled for 12 to 24 hours to 32 degrees C - 34 degrees C when the initial rhythm was ventricular fibrillation. Similar therapy may be beneficial for patients with non-VF arrest out of hospital or for in-hospital arrest.	Mild hypothermia may be beneficial...but hypothermia should not be induced actively after resuscitation from cardiac arrest. (Position was updated in a 2003 science statement from the International Liaison Committee on Resuscitation, which supported induced hypothermia following resuscitation.)	In two randomized clinical trials, induced hypothermia (cooling within minutes to hours after the return of spontaneous circulation) resulted in improved survival and brain function in adults who remained comatose after initial resuscitation from out of hospital VF cardiac arrest.
Tissue plasminogen activator (tPA) is recommended for carefully selected patients with acute ischemic stroke, but cautions that tPA must be administered in	Administration of tPA was recommended for carefully selected patients with acute ischemic stroke if they had no contraindications to fibrinolytic therapy	NINDS results have been supported by subsequent one year follow up, reanalysis of the NINDS data and a meta analysis. Additional trials supported the NINDS results. <i>Note: Higher complications of hemorrhage following tPA was</i>

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the setting of a clearly defined protocol and institutional commitment.	and if the drug can be administered within 3 hours of the onset of stroke symptoms	<i>reported in one study when participating hospitals did not require strict adherence to NINDS protocols.</i>
Pediatric Life Support		
The lay rescuer (1-rescuer) will provide CPR to children (beyond the newly born) using a 30:2 compression to ventilation ratio. Health care providers (2-rescuer CPR) will provide a 15:2 compression to ventilation ratio for all children (outside of the newly born).	A compression to ventilation ratio of 5 to 1 was recommended for child and infant CPR.	While ventilation does appear more important in the resuscitation from asphyxial cardiopulmonary arrest (CPA) in comparison to primary cardiac etiologies of arrest, its role in CPR may still have been over-emphasized
Standard dose epinephrine (0.01mg/ kg) should be used for first and subsequent doses in cardiac resuscitation	High doses of epinephrine (0.1 to 0.2 mg/kg) may be considered for pulseless arrest resistant to treatment with a first 'standard' dose of epinephrine	The use of high dose epinephrine in children shows no survival benefit, and may actually increase neurological morbidity in survivors of asphyxial CPA
Endotracheal drug delivery should only be used when intravenous access/ devices (including intraosseous needles) have been attempted and failed	Dosing with select endotracheal medications is an efficient and clinically effective option in the setting of failed intravenous access in the child with cardiac arrest, shock or respiratory failure	Endotracheal drug dosing is plagued by inconsistent absorption and often detrimental pharmacokinetics. Conversely, intraosseous drug delivery is efficacious in populations ranging from premature infants to adults
Cuffed endotracheal tubes can be safely used in small children (down to one year of age)	For children under the age of 8 years requiring intubation, uncuffed tubes are generally recommended.	Recent studies fail to demonstrate an increased risk of airway injury with the use of cuffed endotracheal tubes. There is, however, potential for significant benefit when used in the care of children with reduced lung compliance or increased airway resistance.
Children that remain comatose after resuscitation from CPA may benefit from a period of therapeutic hypothermia (32-34C for 12-24 hours)	There is insufficient evidence to make a recommendation on the use of therapeutic hypothermia in children resuscitated from cardiac arrest.	Extrapolation from animal and human (adult) data strongly suggests that neurological outcome is improved in CPA victims treated with moderate hypothermia after successful cardiopulmonary resuscitation. The results from neonatal studies are still inconsistent, and good prospective pediatric data is lacking