

# Emergency cardiovascular care guidelines 2005

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Emergency cardiovascular care (ECC) guidelines were first produced in 1974 and were updated in 1980, 1986, 1992, and 2000. In January 2005, more than 300 resuscitation researchers and other experts from the 6 major resuscitation organizations in the world (who form the International Liaison Committee on Resuscitation) met in Dallas, Tex, to rigorously review the research on resuscitation and to develop an evidence-based consensus on science and treatment recommendations.<sup>1</sup> Using this international consensus, the Heart and Stroke Foundation of Canada and the American Heart Association collaborated to develop revised 2005 ECC guidelines.<sup>2</sup> This article provides an overview of the 2005 ECC guidelines, highlighting important differences from previous guidelines for Canadian practitioners.

## Cardiopulmonary resuscitation

Chest compression and ventilation are the basis of cardiopulmonary resuscitation (CPR). Our knowledge of how CPR works has increased since its introduction more than 30 years ago, but many unanswered questions remain about how many compressions and ventilations, provided in what sequence and manner, will provide the best outcomes. Studies suggest that compression rates higher than 80/min with no or few interruptions produce the best results.<sup>3-8</sup> Other studies show that interruptions in compressions are common and that no compressions are provided for a substantial proportion of arrest time.<sup>9,10</sup> Based on expert opinion, the 2005 guidelines increase the compression-to-ventilation ratio to 30:2 for both 1- and 2-person CPR.

For pediatric patients, a compression-to-ventilation ratio of 30:2 is recommended for 1-person CPR to simplify teaching, improve retention, and increase the number and continuity of compressions, but, because most pediatric arrests are primarily hypoxic, a ratio of 15:2 is recommended for 2-person CPR for children older than newborns. Because cardiac arrest in a child might be prevented or effectively treated by ventilation, a single rescuer should perform 1 minute of CPR *before* calling for help.

The practice of "stacked shocks," a part of ECC guidelines for more than 20 years, is replaced by a single (preferably biphasic) shock. With a first-shock efficacy of around 90% for biphasic defibrillation, stacked shocks provide little incremental value and unduly delay compressions.<sup>4,11-16</sup> Recommended shock energy for biphasic defibrillation is 200 J (or use the manufacturer's recommended energy setting if it is known. Because

each manufacturer uses a different biphasic waveform, manufacturer-recommended shock energy will vary). If using a monophasic defibrillator, use 360 J.

Cardiopulmonary resuscitation should be restarted immediately after a shock is delivered: the check for an organized rhythm and for signs of life before resuming CPR has been removed.

Finally, rhythm analysis and defibrillation should be done every 5 cycles of 30 compressions to 2 ventilations instead of every minute.

## Basic Life Support

There is a renewed emphasis on the importance of basic CPR. The major changes in adult basic life support guidelines are as follows.

- Begin CPR if the victim is unconscious, not moving, and not breathing (ignore occasional gasps).
- The process of CPR is emphasized: compress hard (4 to 5 cm), compress quickly (100/min), allow full chest recoil.
- Interruptions of CPR to check circulation, analyze rhythm, or perform other activities should be minimized.
- For mouth-to-mouth, mouth-to-mask, or bag-valve mask ventilation, give each breath with a 1-second inspiratory time to achieve chest rise.
- When 2 or more rescuers are available, it is reasonable to switch the rescuer performing compressions about every 2 minutes or 5 cycles of 30:2 CPR. This switch should be accomplished in less than 5 seconds.
- When the cardiac arrest is unwitnessed, consider giving about 5 cycles of CPR (ie, 1.5 to 3.0 minutes) before checking the rhythm and attempting defibrillation.
- In or out of the hospital, when an arrest is witnessed and when an automated external defibrillator or manual defibrillator is readily available, the rescuer should use the defibrillator as soon as it is available.
- In conscious adults with complete airway obstruction, abdominal thrusts may be applied in rapid sequence until the obstruction is relieved. If the abdominal thrusts are ineffective, the rescuer could consider chest thrusts.
- Laypeople who are untrained but willing to try to perform CPR should provide compression-only CPR.

## Advanced Cardiac Life Support

All Advanced Cardiac Life Support algorithms have been simplified, and the cardiac arrest rhythms (ventricular fibrillation, asystole, and pulseless electrical activity) have been grouped as part of the same algorithm.

- A single shock with a biphasic defibrillator is recommended at the energy setting advised for that device (which is based on the particular biphasic waveform and the impedance-detection configuration of the defibrillator) or 200 J if the device-specific recommendation is unknown. Subsequent shocks should be at 150 to 360 J, again depending on the defibrillator. Those still using monophasic defibrillation should set each shock at 360 J.
- The Laryngeal Mask Airway and esophagotracheal Combitube are acceptable alternatives to the endotracheal tube for airway management. There is ample evidence for the ease of use and effectiveness of these alternative airway devices in cardiac arrest. Delaying or interrupting CPR to place an advanced airway is strongly discouraged.
- The list of drugs recommended for cardiac arrest has been trimmed, and the recommendation to give a vasopressor and an antiarrhythmic now appears later in the algorithm. Atropine for asystole has been downgraded to an intervention that can be considered, as there is weak evidence of benefit from this drug only when asystole is preceded by bradycardia. In ventricular fibrillation, vasopressors should be given following the second defibrillation attempt without waiting to see whether an organized rhythm will develop. There is still no evidence that any vasopressor or antiarrhythmic given during cardiac arrest affects outcome.
- Fibrinolysis can be considered during cardiac arrest caused by proven or suspected pulmonary embolism and following initial failure of standard resuscitation.
- Outside hospitals, treatment of stable tachycardia should be considered only for regular narrow complex tachycardia and should be limited to vagal maneuvers or administration of adenosine. Unstable tachycardia should be treated with immediate cardioversion.
- Unconscious adult patients with spontaneous circulation after cardiac arrest should be cooled to 32°C to 34°C for 12 to 24 hours. The recommendation is stronger for outpatients whose initial rhythm was ventricular fibrillation than for other initial rhythms or locations in keeping with the strength of the evidence.
- There is still insufficient evidence to generate a treatment guideline for the use of vasopressin in pediatric cardiac arrest.
- Drugs should be administered by intravenous or intraosseous injection rather than by the tracheal tube.
- End-tidal carbon dioxide monitoring is recommended not only for postintubation confirmation of tracheal tube position, but now also for ongoing monitoring of airway patency and position among intubated children about to be or being transported.
- Using cuffed endotracheal tubes is now acceptable for children younger than 8 years (except newborns) who are to be intubated. Attention must, however, be paid to tracheal tube size, position, and cuff pressure.
- Previous resuscitation guidelines advised avoidance of fever after cardiac arrest because it is associated with poorer patient outcomes. The new guidelines support, in addition, the use of therapeutic hypothermia (32°C to 34°C for 12 to 24 hours) among children who are comatose after cardiac arrest.
- Biphasic shocks to terminate ventricular fibrillation or pulseless ventricular tachycardia are at least as effective as and less harmful than monophasic shocks. Initial doses of 2 J/kg as monophasic or biphasic shocks are acceptable, with escalation to 4 J/kg for arrhythmia resistant to single shocks. 

### Copies available

Printed copies of the complete North American guidelines are available through your provincial Heart and Stroke Foundation ([www.heartandstroke.ca](http://www.heartandstroke.ca)) or at [www.circulation.org](http://www.circulation.org). All health care personnel are encouraged to take Pediatric Advanced Life Support, Basic Life Support, or Advanced Cardiac Life Support updates as appropriate.

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### Pediatric Advanced Life Support

Many gaps still exist in pediatric resuscitation science, but great strides have been made in the 5 years since publication of the last guidelines. Changes in the pediatric resuscitation guidelines include the following.

- Children in cardiac arrest who receive intravenous epinephrine should receive low doses of 0.01 mg/kg. High-dose (0.1 mg/kg) epinephrine can be harmful and is not generally recommended.

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# Bulletin Board

## Public policy affecting family medicine

The Ontario College of Family Physicians has published a new paper outlining a comprehensive plan that identifies the main issues facing family medicine in Ontario, reviews the literature on current strategies to strengthen primary care systems, and incorporates results of a public survey in conjunction with Decima Research. In her paper, Ms Janet Kasperski, Executive Director and Chief Executive Officer of the Ontario College, offers hope for physicians who are discouraged by coercive measures to redistribute physicians to underserved communities, by deregulation of medical school tuition, by initiatives for hospital and community reform, and by new models of primary care delivery. For more information, visit the Ontario College website at [www.ocfp.on.ca](http://www.ocfp.on.ca) or call 416 867-9646.

## Inaccurate information spread by e-mail

Ovarian Cancer Canada warns that an inaccurate e-mail message urging women to get a blood test engenders unnecessary panic. To combat the urban legend of the CA-125 glycoprotein test as a screening test for ovarian cancer (there is no screening test at present), Ovarian Cancer Canada is launching a national awareness campaign to dispel the myth and to distribute accurate information about symptoms and identification of ovarian cancer. For more information, visit [www.ovariancancercanada.ca](http://www.ovariancancercanada.ca) or call 800 749-9310.

## Prescription drug atlases map spending in Canada

Researchers at the University of British Columbia Centre for Health Services and Policy Research have analyzed how patients in Canada pay for drugs. Researchers used data from IMS Health Canada to compile the *Canadian Rx Atlas* and from BC PharmaNet to compile the *British Columbia Rx Atlas*; electronic copies of both are available from [www.chspr.ubc.ca](http://www.chspr.ubc.ca). These atlases "give policy makers and practitioners access to visual and intuitive representations of the factors driving pharmaceutical expenditures," said Dr Steve Morgan, lead researcher on the project. "This includes price changes, increases in usage, or choices made by doctors and patients when deciding which drug to use to treat a particular condition."

- In general people in eastern Canada spend more on prescription drugs than people in western Canada. In 2004, per capita spending on medicines tracked in the *Canadian Rx Atlas* was \$312 in Saskatchewan and \$486 in New Brunswick.
- Per capita spending on prescription drugs in Canada doubled between 1998 and 2004, largely because of increases in the volume of drugs used and physicians' choosing more costly drugs within drug categories when they treat a particular illness.
- By 2004, cardiovascular and cholesterol drugs accounted for around 40% of total prescription drug spending in Canada.
- By the end of 2005, pharmaceutical spending in Canada was believed to have reached \$20 billion.