

Is it time to replace your monitor/defibrillator?

As a medical professional, it is important to use equipment that helps you deliver the best patient care available. In order to do so, having equipment such as monitor/defibrillators that include standard and recommended clinical parameters and technical design is key.

The following information can be used as a guide to determine if it is time for you to replace your monitor/defibrillators.

Age of Device and Use Patterns

Age of Device — There are currently two sources that regularly review depreciation of medical supplies. The American Hospital Association's 2004 *Estimated Useful Lives of Depreciable Hospital Assets* lists the life expectancy of a defibrillator at five years. *The Department of the Army Technical Bulletin (TB MED 7)* lists life expectancy of a defibrillator at eight years.

Company Defined Product Discontinuation – Manufacturers determine to discontinue products when parts may become obsolete and are no longer available for service and repairs. In addition, upgrading and servicing an older unit may not be as cost-effective for the customer. The following chart lists LIFEPAK® devices no longer available for sale and the dates support ended:

DEFIBRILLATOR	SUPPORT ENDED
LIFEPAK 500 automated external defibrillator (monophasic)	January 2012
LIFEPAK 12 defibrillator/monitor series (monophasic)	October 2012
LIFEPAK 10 and 10c defibrillator/monitor/pacemakers	April 2010
LIFEPAK 9 product	April 2010
LIFEPAK 11 defibrillator/pacemaker	November 2008
LIFEPAK 11 dianostic cardiac monitor	November 2008

Clinical Standards/Guidelines/Evidence

Offering the best in patient care is a priority for all EMS services. It is important to confirm that your monitor/defibrillator has the parameters that allow you to deliver standard monitoring parameters and therapy. The following are the current standard monitoring and therapy standards.

Biphasic Defibrillation vs. Monophasic Defibrillation – Gentle, yet effective, biphasic waveforms are now the standard of care. Because of the effectiveness of biphasic waveforms, defibrillators with monophasic waveforms are no longer manufactured.

The Physio-Control ADAPTIV™ biphasic waveform has been shown in out-of-hospital cardiac arrests to be more effective than monophasic damped sine waveforms for conversion to organized rhythms.¹ In addition Physio-Control escalates the energy to 360J.

Escalating to 360J can improve shock success when lower energy shocks fail.²

Pacing — Transcutaneous pacing is a recommended treatment for symptomatic bradycardias. It can be used for patients who have hemodynamically symptomatic bradycardias as well as bradycardia with escape rhythms. According to the 2010 AHA Guidelines³, avoid relying on atropine and prepare TCP in patients with:

- Third-degree AV block with a new wide-QRS complex where the location of the block is likely to be located in the Bundle of His or more distal conduction system
- Type II second-degree or third-degree AV block

Oximetry: SpO₂ — Pulse oximetry has been in the health care marketplace for decades and its increased use has earned the distinction of the “fifth vital sign” along with blood pressure, heart rate, respiratory rate and temperature. Pulse oximetry has become a standard of care in virtually all aspects of health care.

Capnography: EtCO₂ — Capnography received a Class I recommendation for adults in terms of airway management for the use of continuous quantitative waveform capnography for confirmation and monitoring of ET placement from AHA in 2010.⁴ A study published in the *Annals of Emergency Medicine* found zero unrecognized misplaced intubations when compared to a 23% rate of unrecognized misplaced intubations without EtCO₂ (end-tidal CO₂) monitoring.⁵ Although other means of confirming ET tube placement are available, they are not more reliable than continuous waveform capnography.

In addition, quantitative waveform capnography was given a Class IIb in intubated patients to monitor CPR quality, optimize chest compressions and detect ROSC.⁶

CPR – AHA 2010 Guidelines focus on consistent, high-quality CPR, both chest compressions and ventilations. Among the most significant new recommendations in the guidelines is increased emphasis on the importance of chest compressions; rescuers will be taught to “push hard, push fast” (at a rate of at least 100 compressions per minute and a depth of at least 2 inches), allow complete chest recoil and minimize interruptions in chest compressions, and avoid excessive ventilation.⁷

Mechanical piston devices may be considered for use by properly trained personnel in specific settings for the treatment of adult cardiac arrest in circumstances (e.g., during diagnostic and interventional procedures) that make manual resuscitation difficult (Class IIb).⁸

In addition, the AHA recommends that CPR quality should be monitored.

“Improving care requires assessment of performance. Only when performance is evaluated can participants in a system effectively intervene to improve care. This process of quality improvement consists of an iterative and continuous cycle of:

- 1) systematic evaluation of resuscitative care and outcome,
- 2) benchmarking with stakeholder feedback, and 3) strategic efforts to address identified deficiencies.⁹

“CPR quality can be improved by using a number of non-physiologic techniques that help the provider adhere to the recommended CPR parameters such as rate and depth of compression and rate of ventilation. The most simple are auditory or visual metronomes to guide providers in performing the recommended rate of chest compressions or ventilations.”¹⁰

The effectiveness of metronomes to improve CPR delivery and give feedback to the team, are well supported by a number of studies.¹¹⁻¹⁵

Technical Standards

Battery Technology — Lithium-ion is the latest standard in battery technology because of its low maintenance and higher capacity. Unlike other chemistries, Lithium-ion batteries do not require scheduled cycling to prolong its life. The self-discharge is less than half compared to nickel-cadmium, making Lithium-ion well suited for fuel gauge applications. Because of Lithium-ion high-energy density, batteries can be lightweight and carry higher capacity than other battery types.

Keeping your lifesaving equipment and technology up-to-date is your priority as an emergency medical professional. Your community counts on your system to have the best equipment available in order to provide them with the best care available. The entire line of Physio-Control products—from LIFEPAK monitor/defibrillators, to the LUCAS® Chest Compression System, to the LIFENET® System—can help you meet your goals.

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