



# Helping you save more lives

**Philips HeartStart Resuscitation Solutions**  
Leading the way in quality resuscitation

**PHILIPS**

# The link between early defibrillation and quality

As a worldwide leader in defibrillation technology, Philips has charted the course for treating sudden cardiac arrest (SCA), in and out of the hospital. While early defibrillation has been the primary focus for the past decade, recent scientific evidence has prompted Philips to broaden that focus to include cardiopulmonary resuscitation (CPR) and the fundamental role it plays in improving patient survival. The result is a remarkable product portfolio designed to help responders deliver quality CPR, integrate it with early defibrillation, and ultimately, save more lives.

## The science is clear

The results from several published scientific studies shed light on the vital role that high-quality CPR plays in improving survival, and the critical importance of minimizing interruptions to chest compressions.

Studies<sup>2,3</sup> also show that caregivers, on the whole, do not perform optimal CPR. There is significant variability in the rate and depth of chest compressions, the duration of “hands-off time” and the volume and rate of ventilations.

There is also now a new emphasis on the importance of continuous blood circulation, as well as a deeper appreciation for the harm caused by hyperventilation.

The combination of improved CPR quality and early defibrillation is vital if more victims of SCA are to be saved.

### Key Research Findings

*Philips technologies*

Scientific evidence sheds light on the vital role that high-quality CPR plays in treating sudden cardiac arrest:	Q-CPR	CPR Coaching	Quick Shock	SMART CPR
CPR is performed in only about 1/3 of witnessed arrests. <sup>1</sup>	●	●		
Unassisted CPR quality is low in hospital and EMS settings. <sup>2,3</sup>	●	●		
CPR quality is improved with real-time measurement and feedback. <sup>4</sup>	●			
Minimizing the time between CPR and shock delivery can result in better shock success and return of spontaneous circulation. <sup>5,6</sup>	●		●	
For response times greater than 4-5 minutes, consider the delivery of CPR before defibrillation. <sup>7,8</sup>				●

# CPR



## Embracing the new guidelines

In accordance with this science, the American Heart Association (AHA), European Resuscitation Council (ERC), and the International Liaison Committee on Resuscitation (ILCOR) each published new guidelines in 2005. Together, these new guidelines publications recommend numerous changes in CPR protocols for lay, basic life support (BLS) and advanced life support (ALS) responders.

Philips has not only responded to the new guidelines, we have also contributed to the current state of resuscitation science by participating in peer-reviewed research.

### *Philips Resuscitation Technologies*

*How Philips technologies address 2005 AHA Guidelines recommendations:*

Highlights from the 2005 AHA Guidelines:	Q-CPR	CPR Coaching	Quick Shock	SMART CPR
"Push Hard": Recommended compression depth of 1.5 – 2.0 inches. <sup>9</sup>	●	●		
"Push Fast": Recommended compression rate of 100 per minute. <sup>9</sup>	●	●		
Minimize excessive ventilation. <sup>10</sup>	●	●		
Minimize interruptions in compressions. <sup>9</sup>	●	●	●	
Minimize time to shock after CPR. <sup>11</sup>	●	●	●	
Consider CPR before defibrillation, especially for prolonged response time. <sup>12</sup>				●

# Help save more lives with these firsts in CPR

With these easy-to-use tools, HeartStart Defibrillators not only help you to comply with the new guidelines, they can help you save more lives by going above and beyond to achieve a higher standard for resuscitation.

## Q-CPR™ Measurement and Feedback Technology

### Q-CPR Technology

The Q-CPR tool measures and provides corrective feedback for all components of CPR:

#### Compression

- Depth
- Release
- Rate
- Inactivity

#### Ventilation

- Rate
- Volume
- Inactivity

To help caregivers perform high-quality CPR, Philips offers the first and only real-time measurement and feedback tool integrated into an advanced life support (ALS) monitor/defibrillator to provide personalized feedback on both ventilation and compressions.

The HeartStart MRx Monitor/Defibrillator now features groundbreaking Q-CPR technology, developed in collaboration with Laerdal Medical, a leader in CPR with a legacy of more than 40 years in resuscitation training and therapy.

This one-of-a-kind tool offers objective measurement and corrective feedback for *all* components of CPR. Real time, on-screen data and audio prompting help you perform your best CPR in the moment. And Q-CPR Review software lets you retrospectively evaluate the quality of CPR that was provided to a patient and identify areas for improvement. It supports system-wide continuous quality improvement so your responders are more proficient at performing CPR.

In addition, when used as part of a training curriculum, Q-CPR allows caregivers to practice their CPR delivery in the same way they will perform with patients.

Now, for the first time, you can measure and improve CPR, helping to give your patients their best chance of survival.



**HeartStart MRx with Q-CPR technology**



# technology

“Methods should be developed to improve the quality of CPR delivered at the scene of cardiac arrest by healthcare professionals and lay rescuers.”

– 2005 AHA Guidelines, Page IV-29



“How do we get more bystanders and healthcare providers to learn CPR and perform it well?”

– 2005 AHA Guidelines, Page IV-12

# Instilling the needed for



# confidence that's the lay responder

## CPR Coaching

For lay responders, recalling their training and initiating CPR in the midst of a stressful, chaotic emergency situation can be daunting. That's why Philips HeartStart FRx, OnSite, and Home Defibrillators offer the industry's first CPR Coaching feature for adults and infants/children. Using clear, easy-to-follow voice instructions, it guides responders through each step of CPR, helping to instill the confidence that's needed when treating a person in cardiac arrest. Audio cues signal the appropriate number, depth, and rate of

chest compressions, as well as when and how long to give each breath. A study revealed that the OnSite Defibrillator was the most successful AED at encouraging responders to actually perform CPR.<sup>13</sup>

CPR Coaching is another example of how Philips resuscitation technologies are designed to help responders save more lives by providing patients with quality CPR combined with early defibrillation.

“Some claim that CPR has been made too complicated with too many steps that tax the memory. Some feel that our training methods are inadequate and skills retention has been shown to decline fairly rapidly after training.”

– 2005 AHA Guidelines, Page IV-16



**HeartStart OnSite**

# Minimize the hands-off end of CPR and shock

## Quick Shock

Chest compressions performed during CPR set off a wave of beneficial effects that re-energize the heart and prime it for a defibrillation shock. But those beneficial effects fall off rapidly once chest compressions are stopped. As time quickly passes, the ECG weakens, circulation ceases, energy sources for the heart are depleted, and the heart is less likely to convert to a normal rhythm once the shock is delivered.

That's why current HeartStart automated external defibrillators (AEDs) and the HeartStart MRx (in AED mode) feature Quick Shock, giving them a very short interval between the end of CPR and delivery of a shock, typically less than 10 seconds. By minimizing the interruption of CPR chest compressions, Quick Shock technology increases the chance that a shock will result in a patient's successful return to circulation.<sup>5,6</sup>



**HeartStart FRx**

“Analyses of VF [ventricular fibrillation] waveform characteristics predictive of shock success have documented that the shorter the time between a chest compression and delivery of a shock, the more likely the shock will be successful. Reduction in the interval from compression to shock delivery by even a few seconds can increase the probability of shock success.”

– 2005 AHA Guidelines, Page IV-36



# interval between the delivery



# Helping you personalize your specific patient



# care to

## Looking to the future

**Philips continues to work to support the link between quality CPR and early defibrillation. As we advance the science and drive new protocols, new technologies will be pioneered and introduced into the HeartStart family of resuscitation solutions. This, we believe, is the most promising path to improving survival from sudden cardiac arrest.**

## SMART CPR

Professional responders must quickly determine the best course of treatment when responding to SCA. Until recently, immediate defibrillation with an AED was the general rule. However studies now show the benefit of providing 1 1/2 to 3 minutes of CPR prior to a shock if the response time to the patient is greater than 4 to 5 minutes.<sup>7,8</sup> Unfortunately, it is often not possible for responders to determine on arrival how long the patient has been down. And the detrimental effects of delay affect individual patients differently. Should the responder immediately shock the patient, or should they first administer an interval of CPR, followed by a shock?

In response to this dilemma, Philips has introduced SMART CPR in its HeartStart FR2+ AED. When SMART CPR is enabled, the HeartStart FR2+ evaluates key attributes of each individual patient's presenting heart rhythm and advises whether to initially treat shockable rhythms such as VF with a shock, or with CPR immediately followed by a shock.

SMART CPR bases its treatment recommendation on objective physiological measurements of each individual patient's heart rhythm. In contrast, other protocols may dictate treatment based solely on the time that a patient has been down (which is often impossible for responders to know), without regard to differences in individual patients.

Simply put, SMART CPR takes away the guesswork and helps responders make better-informed, more refined treatment decisions personalized to each individual patient. It supports an emerging response protocol that current scientific literature and the 2005 Guidelines suggest may improve survival for more patients.



**HeartStart FR2+**

“After about 5 minutes of VF with no treatment, outcome may be better if shock delivery (attempted defibrillation) is preceded by a period of CPR with effective chest compressions that deliver some blood to the coronary arteries and brain.”

– 2005 AHA Guidelines, Page IV-12

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Would you like to know more about our innovative products? Please do not hesitate to contact us. We would be glad to hear from you.

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**Philips—The trusted choice**

- A Fortune Global 500 company, Philips is one of the world's largest electronics companies with annual revenue of over \$8 billion in healthcare solutions alone.
- More than 400,000 Philips defibrillators have been deployed on airlines, and in airports, workplaces, buildings, and communities worldwide.
- HeartStart defibrillators have over 10 billion service hours logged, with an additional 9 million hours added every day.

To learn more about Philips HeartStart Resuscitation solutions, and how we can help you save more lives, call 1-800-453-6860, or visit [www.philips.com/heartstart](http://www.philips.com/heartstart).

**References**

- <sup>1</sup> American Heart Association. 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care. *Circulation*. 2005; 112:IV-16.
- <sup>2</sup> Abella, et al. *JAMA*. 2005; Vol. 293, No. 3, pp. 305-310.
- <sup>3</sup> Wik, et al. *JAMA*. 2005; Vol. 293, No. 3, pp. 299-304.
- <sup>4</sup> Kramer-Johansen, et al. *Resuscitation*. 2006; 71, 283-292.
- <sup>5</sup> Yu, et al. Adverse Outcomes of Interrupted Precordial Compression During Automated Defibrillation. *Circulation*. 2002; 106:368-372.
- <sup>6</sup> Eftestol, et al. Effects of Interrupting Precordial Compressions in the Calculated Probability of Defibrillation Success During Out-of-Hospital Cardiac Arrest. *Circulation*. 2002; 105:2270-2273.
- <sup>7</sup> Wik, et al. *JAMA*. March 19, 2003; Vol. 289, No. 11.
- <sup>8</sup> Cobb, et al. *JAMA*. 1999; 281:1182-1188.
- <sup>9</sup> American Heart Association. 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care. *Circulation*. 2005; 112:IV-25, 26.
- <sup>10</sup> American Heart Association. 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care. *Circulation*. 2005; 112:IV-25.
- <sup>11</sup> American Heart Association. 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care. *Circulation*. 2005; 112:IV-36.
- <sup>12</sup> American Heart Association. 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiac Care. *Circulation*. 2005; 112:IV-12, 25, 27.
- <sup>13</sup> Fleischackl, et al. Differing Operational Outcomes with Six Commercially Available Automated External Defibrillators. *Resuscitation*. 2004 August; 62(2):167-74.



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