

# Pediatric Advanced Life Support Your Way

**I**N CASE YOU HAVEN'T NOTICED, THERE IS A REVOLUTION taking place in medical education that is unrivaled in significance since the release of the Flexner report in 1910. The Flexner report triggered reforms in the standards, organization, and curriculum of North American medical schools by proposing a system strong in biomedical sciences and hands-on clinical training. The current revolution directs us toward an approach that can be loosely defined by the buzz phrases of "student-centered learning," "competency-based evaluation," and "80-hour work rules." These winds of change in medical education are most associated with residency programs, but in reality, they affect us all.

## *See also page 649*

In the subspecialty of pediatric emergency medicine, we are challenged with being responsive to the emergency medicine educational needs of physicians who practice outside of the emergency department. Perhaps foremost among those physicians are community pediatricians who must be able to competently respond to the office emergency. In our experience, pediatricians *want* to be prepared for the office emergency. They frequently seek our advice concerning equipment needs and stock medications. They care about training and express interest in ways to sharpen and maintain their resuscitation skills. They also provide the feedback that they want resuscitation courses that are relevant to their practice, are conveniently scheduled, and use their time efficiently. Time, after all, is a precious commodity, and courses such as the pediatric advanced life support course (PALS) can represent time away from the office and family. Most importantly, pediatricians want courses that improve self-efficacy so that at the end of training, they believe in their ability to care for a sick child. The educators, for their part, want courses that effectively impart the necessary knowledge, attitudes, behaviors, and skills required for resuscitation. To summarize, we believe community pediatricians want courses, like PALS for example, to be flexible, efficient, efficacious, and effective.

The study by Gerard et al<sup>1</sup> describes their experience with adapting traditional PALS to a Web-based format. As they point out, this distance learning format provides flexibility for the student. They provide data that the Web-based course is as effective in promoting cognitive and psychomotor learning as the traditional PALS course. All of the Web-PALS students passed the written examination, although at a slightly lower mean score

than the traditional PALS students (mean score, 95.4% vs 97.1%, respectively). Overall procedure scores were the same in both groups for rapid cardiopulmonary assessment, bag-mask ventilation, and defibrillation and were significantly higher in the Web-PALS group for tracheal intubation and intraosseous needle insertion. Furthermore, satisfaction with the online concept was high, with 100% of responding participants acknowledging that they would recommend the Web-PALS course to colleagues. The students perceived the course as a highly positive educational experience.

We believe that this study represents only the first step in compelling resuscitation education to be more user friendly. There are other indications that resuscitation courses can be made more available to those with limited time without sacrificing learning. The American Heart Association, Dallas, Tex, recently developed a system for student-centered cardiopulmonary resuscitation education that can be completed in a fraction of the time of a traditional cardiopulmonary resuscitation course. This CPR Anytime kit includes a 30-minute instructional DVD, an easily inflatable mannequin, a program booklet, and supplies to clean and maintain the mannequin. The program is designed to be self-contained, practical, and eminently convenient. Its portability encourages use anywhere a DVD player is located at any time suitable to the user. Lynch et al<sup>2</sup> proved the utility and efficacy of a training kit with essentially the same contents for a group of lay responders. The researchers concluded that this kind of program could significantly increase the number of lay responders able to perform effective cardiopulmonary resuscitation.

Returning to the theme of Web-based learning, the advantages of such a system are clear. Not only does the Internet promote flexibility and convenience for the user, but it also allows the incorporation of multimedia presentations to enhance learning. Retention of information is promoted through seeing the concepts in words and pictures, hearing audio explanations, and evaluation by interactive testing throughout the educational module. Building Internet-based content can be difficult and very time consuming, but commercial products are available to facilitate the process. One such system, Blackboard (Blackboard Inc, Washington, DC), has been evaluated and found to be successful as an educational tool.<sup>3,4</sup>

Virtual reality is another technology that, in addition to the Internet, holds a vast, largely untapped potential for medical education. As the interface between human perception and computer-generated sensory input, vir-

tual reality has been successfully used in fields outside of medicine, namely aviation, military, business, and nuclear energy.<sup>5</sup> Some medical applications of virtual reality simulation have been developed, particularly in the areas of anatomy education<sup>6</sup> and laparoscopic surgery.<sup>7</sup> Although it is expensive and labor intensive to create, virtual reality is recognized as an effective method of simulating high-stress scenarios<sup>8</sup> such as resuscitation in a non-threatening manner.

Flexibility and choice are popular marketing strategies in modern American society. You can order a fast-food hamburger your way and buy services that give you the freedom to watch your favorite television shows anytime, anywhere. Why not tailor the options in resuscitation education to meet the needs of the student? Of course, this is easier said than done, and we are not suggesting that competence or interaction with an educator be sacrificed on the altar of flexibility and choice. However, dream of the possibilities for a moment.

Pediatric and infant human patient simulators are a reality. High-fidelity simulators are computer-controlled mannequins that can be programmed to elicit a wide variety of sensory responses to participant actions. Eyes blink or remain closed, palpable pulses increase and decrease their rate and quality, and laryngospasm causes intubation to be more difficult. Resuscitation scenarios are only limited by the programming capability of each simulation laboratory. Centers around the world are studying the application of high-fidelity simulation to medical education.<sup>9,10</sup> We believe that the data will be supportive, and we envision a world where physicians develop or refresh skills in pediatric resuscitation by scheduling a session convenient for them at a pediatric human patient simulation center or do it all using a virtual learning environment.

We believe that PALS your way is possible, desirable, and just around the decade.

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"The tobacco habit, while it does not compare with those just discussed in the seriousness of its results, is of no benefit, is of great and useless expense, and is often the direct cause of a derangement of the healthy actions of the body. Its use has been demonstrated to be very dangerous to the young. It is a habit easily avoided, and one that no one who has formed it would advise you to form."

—From *Advanced Lessons in Human Physiology*, Indiana State Series by Oliver P. Jenkins, PhD, 1891