

Education in Adult Basic Life Support Training Programs

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The Panel on Educational Issues in Adult Basic Life Support Training Programs reviewed the characteristics of adult learners, aspects of educational theory, issues concerning barriers to learning and performing CPR, and issues concerning testing and evaluation.

The panel made the following recommendations: a comprehensive evaluation of the basic life support program with the goal of improving the program design and educational tools must be initiated; adult programs must be designed to motivate laypersons to become trained in CPR, as well as to target relatives and friends of high-risk individuals; and emotional and attitudinal issues, including the student's reluctance to act in an emergency, must be addressed. Programs must incorporate information on the willingness of an individual to perform CPR; CPR programs must be simplified and focus on critical success factors; flexible educational approaches in programs are encouraged; flexible programming that addresses the needs of the allied health professional is encouraged; formal testing should be eliminated for layperson programs; and formal testing for health care providers and instructors should be continued.

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OVERVIEW OF ISSUES

Learning What is learning? To date, there is still no universally accepted definition of learning. As with many concepts that are basic to a discipline, learning is not easily defined, because we can never see learning directly or study it in isolation.

Generally, the term *learning* has been used to describe either a process, product, or function. If learning is viewed as a process, its success is defined in terms of the *method* used to modify behavior. If learning is viewed as resulting in a product, its success is defined in terms of the *outcome*, not the method by which the outcome was

derived. If learning is viewed as a function, then its success is defined in terms of specific critical aspects of the process, such as motivation. Learning is a relatively permanent process, resulting from practice and reflected in a change of performance.¹

Classic educational theorists²⁻⁴ have offered what has become perhaps the most generally accepted description of learning as a complex process that involves the emotions (affective domain), body (psychomotor domain), and the brain.

What should course participants learn? To date, basic life support (BLS) programs have focused on delivering an abundance of information in a relatively short time, with the expectation that when confronted with an emergency, the course taker will somehow be able to sort through the information, grasp the few items that are truly important, and take action. Present programs place emphasis upon rote memorization of psychomotor performance criteria for rescue breathing, relieving airway obstruction, and CPR. In CPR alone, over 50 individual critical performance criteria are identified.

As a radical departure, one should consider that there are really only four basic elements that people want to learn: 1) preventing injury/illness, 2) recognizing an emergency, 3) getting more help, and 4) providing basic care until help arrives.

The first element — how to prevent an unwanted incident (such as serious injury from a motor vehicle accident or sudden illness resulting from cardiovascular disease) — seems rather straightforward, but many unanswered questions remain. There is a debate over whether one can truly effect a change in a person's behavior — in essence, modifying a life-style. One questions what strategies work best for different age groups. One can strive to measure the outcome of these efforts in concrete terms to determine if they have been successful. One recognizes the ability to see the illness/injury that is prevented. Clearly, there is inconclusive evidence to support any contention that life-styles have been impacted by participation in BLS programs.

The next two elements involve the decision to act. The ability to recognize the signals of an emergency and knowing when and how to summon help are perhaps the most important elements of the four basic components that people want to learn in BLS courses. Yet, an abundance of studies⁵⁻¹¹ have demonstrated over the past 25 years that people delay seeking help either because of a reluctance to admit that an emergency exists, an inability to overcome the ambiguity of the situation, or they do not know it is an emergency. Again, one must question how

successful BLS programs have been in this area.

The final element involves providing care until help arrives. This is a complex cognitive and affective process involving decision-making and psychomotor skills. Performing these skills requires that a person trained in CPR retain the knowledge to perform them.

Adult Learners Four adult learning characteristics must be addressed in any BLS program revisions: self-direction, experience, psychomotor skill-learning factors, and skill acquisition variables. Some of these characteristics were recognized and integrated into the last major curriculum revision in the mid-1980s.

The first concern, self-direction, is the well-established principle that adults want to set their own learning pace, use their own learning style, keep learning flexible, and maintain their own structure for learning new information. The most common motivation of adults for undertaking a learning activity is the anticipation of using the skill or knowledge.^{12,13} If an adult learner anticipates using new knowledge or skill in the immediate future, attention is focused and learning occurs. However, if the adult is taking a course with the anticipation of using the skill at some future date with some vague notion of becoming a heroic lifesaver, learning is more diffuse and unfocused. If the adult learner's motivation is to acquire a card to meet some external regulation, learning also is focused differently. Each of these motivations causes the adult learner's characteristic of self-direction to change. This unstable characteristic has significant relevance to program design. Adults seek out learning to solve a problem which they have defined in their own way.

Unless a variety of options are available for adults to use BLS information, knowledge, and skills, a large audience of potential heart savers will be lost. Adult learners must be given choices in their pursuit of knowledge. The curriculum must be flexible, and instructors must be allowed to build a curriculum for an individual or group and fit it to the learners' objectives for seeking the knowledge.

The second issue, experience, is related to the role experience plays in adult knowledge. As people grow and develop, they have an increasing reservoir of experience that becomes a rich foundation and source for learning. Furthermore, they attach more meaning to learnings they have gained through experience than those they acquire passively.¹⁴ This compels us to design BLS programs to recognize those experiences and use them to help learners expand their knowledge. The primary methods should be experiential — that is, discussion, problem-solving cases, and simulation. Even field experience can be used as a

learning opportunity for selected populations of adult learners.

The third characteristic relates to psychomotor skill factors. Adults, as they mature (and depending on their personal activity levels), may lose some psychomotor capacity. As mentioned earlier, an adult learner's motivation may cause them to be uninterested in the performance aspects of BLS. Despite these variable characteristics, classic research still supports the integration of distributive practice and feedback during the acquisition of any psychomotor skill.¹⁵ The implication of this characteristic for BLS program improvements points to the need for a serious look at the outcome expectations with the current curriculum.

The fourth issue is skill acquisition variables. The newer use of the word *skill* goes beyond the classic three domains of learning: cognitive, affective, and psychomotor skills. Research integrates all three domains and illustrates how we acquire skill over time with experience, practice, and deliberative rationality.^{16,17} Information is available about how we use knowledge and experience to refine the performance aspects of any skill. For example, with experience and reflection, the way we manage a resuscitation attempt will change over time. The way we may use a curriculum with a group of learners motivated by the need for a card versus a group motivated by the need to know how to save their infants on apnea monitors will also change and improve.

Careful study of the skill acquisition process shows that we usually pass through at least five stages of qualitatively different perceptions of the task as our skill at the task improves. The stages have been labeled *novice*, *advanced beginner*, *competent*, *proficient*, and *expert*. This information must be applied to our outcome expectations of BLS programs. Learners can be helped along this continuum of skill acquisition over time, usually years. Expectations of learners on completion of a learning activity must be related to their previous experience with learning and applying the skill. What is taught during review sessions must be relative to the learners' experience and their skill acquisition stage.

Retention Numerous retention studies document serious skill deterioration among both laypersons and professionals within 6 months to 1 year following training.¹⁸⁻²² This information on skill retention by course participants raised troublesome questions. Is the problem with our students, the curriculum, or with BLS instructors?

There are strategies that help improve skill acquisition and retention. In regard to psychomotor skill achievement

in general, educators point to the time spent practicing successfully with feedback from an instructor as being positively related to skill acquisition. It has been shown that using a simplified CPR curriculum results in substantially better skill retention, even after 12 months.²³ Another study reported that increases in skill practice resulted in a considerably higher level of skill mastery at completion of the course and at five months after training.²⁴ It also has been shown that less stringent training and evaluation criteria resulted in greater retention at three- and eight-month intervals.^{25,26} Just the viewing of videotapes showed promise for reversing skill degradation.²⁷

Even with the promise of better skill acquisition and retention, we still have not identified strategies that would result in people overcoming barriers to action and consequently acting sooner when faced with an emergency.

In BLS courses, it is explained that heart attacks and cardiac arrests occur most frequently among older adult populations. Because BLS programs focus on diseases that can begin earlier in an adult's life but do not take their toll until later, one should consider the need to adopt strategies that target specific populations with specific messages.

Approaches must be flexible and consider a number of critical learning characteristics and optimum conditions that foster adult learning. Adults learn best in a nonthreatening environment that can provide trust and a sense of accomplishment and self-worth. Teaching and learning among adults therefore must be an integrated process that fosters a spirit of inquiry and allows the participant to easily transfer information gained into solving practical problems.

Barriers to Learning and Performing CPR A large number of cardiac arrests take place in the home. Thus, the person most likely to be on the scene of a witnessed arrest is a spouse or loved one. Numerous surveys of CPR training have been conducted through telephone interviews with the public and surveys of CPR class participants.^{28,29} They show that the majority of trainees were under 40. In Seattle, most CPR students take training through their place of business, and many are required to take the course.

Few trainees are older than 50 or have overt coronary heart disease (CHD) or even high blood pressure in the family. Few individuals choose to be trained because they or a family member has coronary disease.

Why don't older citizens take CPR classes? Why don't family members of patients at risk for sudden cardiac death learn CPR? While there is research that correlates

CPR training with demographic characteristics and the presence of CHD, there has been no attempt to probe why people choose to be trained, or more importantly, why they choose *not* to be trained.³⁰

There are several potential barriers to choosing to be trained and to performing in an emergency. One of the greatest of these potential barriers is the fear of imperfect performance. No body of research deals specifically with this area. Numerous studies have shown that initial performance on most skills can meet at least relaxed criteria, but subjects have difficulty putting all the skills together and retention is poor. Extensive observation and interviews with class participants have revealed great fear in the areas of practicing/testing in class and/or not doing the skill well enough in an actual emergency.

A second barrier is a reluctance to take charge in an emergency situation. Individuals have reported a fear of taking responsibility for their actions.

Another barrier is the ability to recognize the situation and make the decision to access prompt medical care. In a recent study, there was a reported delay of from two to four hours between the onset of symptoms of an acute myocardial infarction and arrival at the hospital.³¹ Patient denial also plays a key role and leads to further delay.

Anxiety, guilt, and other psychosocial factors (such as one's self-perception) also are other barriers that must be addressed. Family members learning CPR can cause anxiety in high-risk patients. It has been reported that high-risk patients whose families had received CPR training were more anxious three months later than control groups of high-risk patients whose families received education about risk factors or no intervention at all.³² There were no adverse psychological effects on the trained family members.

Families of hospitalized CHD patients have been reported to be more anxious before CPR training than were the families of nonhospitalized CHD patients and families of a control group. Immediately after training and two months later, there was no difference among the groups. The trained family members showed a decline in anxiety. The authors concluded that knowledge of CPR may be therapeutic for families of CHD patients.³³

Self-perception is another perceived barrier; many laypersons feel that they are too old, weak, or ill to learn and perform CPR. Elderly and depressed family members, in some circumstances, were less likely to demonstrate adequate CPR skills.³⁴

Rescuers may be afraid of close contact with victims who may have unpleasant physical characteristics. Personal interviews of bystanders who had performed

CPR, some of who were exposed to disagreeable characteristics such as alcohol on breath, dentures, visible blood, and vomitus, revealed that none of the bystanders reported that they hesitated to perform CPR.³⁵ However, this study does not account for the possibility that bystanders at the arrests where lay CPR was *not* performed, avoided CPR because of the conditions of the victims.

Regardless of skill level, if a resuscitation is unsuccessful, it is logical to assume that some bystanders will feel guilt. In Seattle, citizens who were given telephone CPR instructions by a dispatcher were asked about adverse effects. The interviewer reported that for many subjects, the interview itself acted as a debriefing.

To the lay public, there is a fear of infection in performing CPR. In many areas this translates as fear of infection by the human immunodeficiency virus (HIV), especially in performing mouth-to-mouth ventilation. This fear influences whether people choose to be trained and whether they will perform CPR. The actual risk of transmission of HIV is extremely low or zero, but the fear of disease transmission is out of proportion to this fact.

In a survey of participants in a mass training course, more than 90% stated they would perform CPR on a stranger. However, when asked about a confirmed or suspected AIDS patient, fewer than 45% surveyed (immediately after training) and 32% (on follow-up) would perform CPR.

In a survey of BLS instructors in Virginia, of those respondents who reported they had actually performed CPR, 40% had hesitated to perform mouth-to-mouth ventilation, and 40% reported having witnessed another provider hesitate.³⁶ When presented with possible rescue scenarios, 97% would perform mouth-to-mouth ventilation on a child, 54% would perform mouth-to-mouth ventilation on a female college student, only 10% would perform mouth-to-mouth ventilation on a victim of a heroin overdose, 18% would perform mouth-to-mouth ventilation on a male on a San Francisco bus, and 29% would perform mouth-to-mouth ventilation on a male at a New York City football game.

In an unpublished study, telephone surveys were conducted of randomly selected citizens in Seattle, New York City, and Lincoln, Nebraska. Almost 40% of the respondents in all three cities expressed fear of infection from the training mannequin and between 70% and 75% feared infection from performing mouth-to-mouth ventilation on a stranger.³⁷ More than 70% of the respondents in the three cities expressed greater willingness to perform mouth-to-mouth ventilation if they had a face mask or shield. This does not, however, mean that they would do

nothing to help. Almost all said they would call 911, and at least 85% would check for consciousness.

Evaluation and Testing The goal of BLS programs must be to educate, not to test and certify. Several years ago, the American Heart Association removed "certified" from its cards and literature replacing it with "course completion." Despite this, the implications of certification still persist.

Resuscitation education programs must emphasize in instructor training and instructor materials that the goal is to improve each participant's ability to respond to a cardiac or respiratory arrest, taking into account that person's likely role and prior training. This shift in philosophy will have different implications for the educational network based on whether the course participants are laypersons or health care providers.

Adults attend educational programs to acquire the skills and knowledge to solve a problem. When evaluation (testing) of a participant is used to determine whether that person "passes" or "fails" a course, the evaluation may increase anxiety and impair the acquisition of skills. More importantly, the self-doubt or negative feedback stimulated by the test may inhibit the participant from performing the skills during a real emergency.

Standards used by BLS instructors in the testing of participants vary greatly.³⁸ Moreover, there are no data to support the concepts that the technical correctness of a lay rescuer who attempts CPR or the interval since last training correlates with the likelihood of a favorable outcome. There is, therefore, no rationale for discouraging a participant from performing CPR in a real setting based on test results during a course. Evaluation of the participants skills and knowledge is essential, but not to determine whether a participant passes.

In the educational paradigm, evaluation (testing) plays a key role, providing essential information to the participant, the instructors, and the course leaders. Evaluation helps the participant identify areas of personal difficulty needing further work and motivates the participant to learn. Evaluation provides instructors with insight into a particular participant's problems and allows them to improve the effectiveness of rendition efforts. Evaluation results can provide the course leaders with information about the participant population enrolled in the course. It can provide information about the strengths and weaknesses of the course, the choice of curriculum, the method of presentation, and the overall assessment of whether the program was successful.

Acquisition of knowledge may be evaluated through either oral or written examination. When written examinations are used in a course aimed at "certifying" rather

than "educating," test security is a high priority because the score on an examination has practical implications. In a course with a purely educational focus, test security is not as important. The examination can be made available to the participant as a study guide or can be used as a pretest to help the faculty understand the strengths and weaknesses of a particular group. Open-book review or class discussion after the examination is completed also has been very helpful as an approach to improve the cognitive knowledge of an individual. The instructor can review questions missed by the participants, discussing not only the correct answer but also the knowledge and problem-solving process required to answer correctly.

Acquisitions of skills can be evaluated through observation of the participant performing CPR. The participant should be informed that the results will not be used to grade the participant or determine passing; rather, they will be used to identify to the participant and instructor those areas needing further work. The results of the evaluation of psychomotor skills should be used solely for participant feedback, instructor feedback, and educational quality control.

COMMENTARY

The panelists and attendees at the National Conference on CPR and Emergency Cardiac Care were in general agreement that the characteristics of adult learners are addressed to some degree in the BLS educational programs. It was recommended at the 1985 conference, and repeated again in the 1992 conference, that the AHA begin a comprehensive evaluation of its current BLS teaching and testing materials and that these materials be adjusted to appropriate learning levels and focused on targeted audiences. A number of changes were made after the 1985 conference. A modular course curriculum was implemented; programs were targeted to high-risk groups, especially in the pediatric and neonatal areas. There is still, however, a lot of work to be accomplished in this area.

CPR courses must reach older citizens and others who have resisted training. Programs must focus on the fact that more than 70% of cardiac arrests take place in the home, and the first responder is most likely a loved one. As such, families of high-risk individuals play a key role in developing emergency action plans that will indeed save lives. It must be emphasized that courses can be flexible, can reduce the time required, and, as an added value, may improve the quality of one's life.

Students should be trained to rehearse making decisions about how and on whom they will perform the

skills they have just learned. Decisions on resuscitation are not simply "yes/no" but depend on the situation and the rescuer's relationship to the victim. The choice is not only between walking away or performing complete CPR. With well-trained first responders, improved emergency medical services systems, and rapid defibrillation, survival can be increased if laypersons do nothing more than call 911 (or the appropriate emergency number).

Training must be less threatening, and skills must be simplified. Concentration on those skills considered essential should improve performance and retention and should make instructor and refresher training more attractive for lay students. A first step in this process would be to simplify the multiple performance steps and training scenarios. However, it is still to be determined what the minimum critical steps are that will improve outcome from cardiopulmonary arrests.

The complex ratios and numbers utilized in BLS training also were discussed. It was suggested that all ratios should be simplified and made universal for adult and pediatric populations. However, no physiologic or educational science was presented that would justify this recommendation at this time.

There was agreement that flexible approaches to education in terms of getting out of the classroom, moving into the home (with public service announcements), videotapes, and situation-based exercises are ideal supplemental approaches to the BLS program. Cautions were expressed regarding too much of a compromise in practice time. Individuals must spend time practicing their psychomotor skills so that they will remember the critical steps and actions required to help a loved one in the event of a real emergency.

The major area of controversy in the educational panel revolved around the issues of testing and evaluation. All individuals agreed that course participants should be evaluated and provided with better feedback of knowledge and skill acquisition. There was a strong agreement that the problem learner should be identified earlier and remediated tirelessly. However, it was at this point that the agreement stopped. It is recommended that formal testing for "pass" or "fail" be deleted from layperson BLS programs. Some individuals felt that testing should be optional for lay individuals. Others felt that by deleting testing, the quality of the educational effort in the lay BLS programs would be compromised severely.

There was agreement that testing should remain a key component for health care professionals and instructors in the BLS program. In support of testing for health care pro-

fessionals and instructors, a number of statements were made that these individuals should be held to a higher standard of performance for CPR, as they may indeed have a job-related responsibility. However, against this point of view is the fact that the program is, and should remain, an educational effort.

Major responsibilities of the AHA in the field of resuscitation are to identify the best way to perform resuscitation based on the available scientific data and to develop educational programs to equip individuals with this knowledge and skills. Stronger emphasis on evaluation of these individuals' skills and utilization of this evaluation as an effort to improve the quality of CPR programs is a key focus for the future.

Finally, while it was acknowledged that hospitals and/or employing agencies are responsible for assessing the competency of individuals, there was a very strong sentiment that course completion cards should continue to be issued by agencies conducting BLS courses.

RESEARCH INITIATIVES

A number of research initiatives were identified during this panel discussion. There is an obvious need to study and evaluate what teaching strategies are the most effective for specific targeted populations. There is a need to further quantify specific barriers to learning and performing CPR. Included in this should be an evaluation of the complex numbers and ratios included in a CPR program in comparison to a more simplified model. There is a need to clearly define the minimum number of critical steps that will lead to improving outcome from cardiac arrest. Finally, there should be a study of testing versus evaluation and its impact on knowledge and skills retention.

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TRAINING PROGRAMS

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