ABSTRACT

Miley, Richard P. An evaluation of the effectiveness of two teaching methods on retention of basic cardiac life support for the lay community. M.S. Health Education, 1986. 114p. (Dr. R. Daniel Duquette).

The purpose of this study was to test the effect of two teaching methods: the traditional lecture method and the modular self-paced method, on the retention of Cardiopulmonary Resuscitation (CPR) cognitive knowledge and psychomotor skills of the lay community three months after completion of the class.

The primary question to be examined was: does the method of instruction affect retention of Basic Life Support (BLS) knowledge and skill?

The sample population consisted of 12 males and 13 females from the area in and around LaCrosse, Wisconsin. Participants completing the course regardless of teaching format earned a one-year BLS certification through the American Heart Association.

At the initial CPR class a psychomotor skills test and 50-item multiple choice pretest was administered. At the three month follow-up session only psychomotor skills were tested.

The independent groups t-test was the statistical test used to analyze the dependent quantitative interval variable, retention scores, and the independent between subjects variable, the modular self-paced versus the traditional classroom instruction teaching formats.

Results of the data analysis indicated that the t-test was statistically significant ($t=-3.50$, $df=19$, $p<.05$), indicating that the mean retention score for the modular self-paced group (6.9) was significantly higher than the mean retention score for the traditional group (3.1). The conclusion that can be drawn from the data is the statement "the t-test was statistically significant" indicates the null hypothesis can be rejected.

AN EVALUATION OF THE EFFECTIVENESS OF TWO TEACHING METHODS ON RETENTION OF BASIC CARDIAC LIFE SUPPORT FOR THE LAY COMMUNITY

A Thesis Presented

to

The Graduate Faculty

University of Wisconsin-LaCrosse

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by

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CHAPTER I

INTRODUCTION

Twenty-five years have passed since the introduction of external chest compression offered hope for substantially reducing the nearly 1,000 prehospital sudden deaths per day in the United States (Kouwenhoven, Jude, and Knickerbocker, 1960). It has been estimated that full implementation of potential life saving mechanisms in the community could save between 100,000 and 200,000 lives each year in the United States (JAMA, 1986).

In 1984, cardiovascular disease accounted for 978,000 deaths, nearly 50% of deaths from all causes, including 540,00 deaths due to coronary heart disease, a majority of which were sudden deaths (Monthly Vital Statistics Rep. 1985).

Since 60% to 70% of sudden deaths caused by cardiac arrest occur before hospitalization, it has been suggested that the community has potential for being the ultimate coronary care unit (McIntyre, 1980). This optimism is clouded by the problem of how to train and retrain all those who need to know cardiopulmonary resuscitation (CPR), especially when volunteer instructors are in short supply and funding for CPR training is limited. Since there is no way of predicting when an individual will be required to use CPR skills, it is important to ascertain if, once acquired, these skills can be effectively retained.

CPR instructors have become increasingly concerned about the retention of psychomotor skills of the participants who have completed basic CPR classes.

Background

In order for the goal of 100,000 lives saved per year to be reached, factors that impact on the success of CPR must be better understood. The new information can then be transposed into training techniques that will allow that goal to be reached. In 1983 an estimated two thirds of the adult United States population indicated an interest in being trained in CPR. According to a Gallup poll, the proportion of those adults who knew about CPR increased from 66% in 1977 to 87% in 1983 (JAMA, 1986).

Tremendous strides have been made in the resuscitation of these victims, along with the realization that cardiac arrests are emergencies for which all persons should be able to initiate treatment. This realization has led to an upsurge in the number of people desiring and needing certification in Basic Life Support (BLS) which includes instruction in emergency cardiac care to prevent circulatory and/or respiratory arrest through prompt recognition and intervention, using external support of the circulation and respiration through CPR. The demand for BLS courses often exceeds their

availability. With the importance of refresher courses, the possibility of supplying the necessary instruction becomes increasingly difficult. One attempt to resolve this problem has been the modular self-paced approach to CPR training, in which the instructor's time is minimized making the instructor's primary role that of facilitating the learning process and validation of the learning skills.

CPR has now been acknowledged as a vital component of emergency care in all aspects of life, at home and on the job. With continued interest and expansion in CPR training, the number of businesses and industries making training available to their personnel has increased. Although the effects of CPR training are lauditory, few studies have been published evaluating CPR training, and particularly skills retention. In recent years public interest in CPR training has increased along with evidence that the effectiveness of bystander-initiated CPR can improve survival rate of out-of-hospital cardiac arrest victims (Thompson, Hallstrom and Cobb, 1977). Yet, if CPR skills are inadequately learned or not retained, CPR may be performed needlessly, ineffectively, or in a manner injurious to the victim. Therefore, the benefits of teaching CPR to a greater number of people in short courses (three to four hours) needs to be weighed against more comprehensive training provided in long courses (eight or more hours) which may attract fewer students.

Significance of the Study

Studies indicate that if more people were trained in CPR the number of deaths from cardiac arrest could be decreased (Thompson et al., 1977). Over twelve million adults in the United States have received CPR training through programs sponsored by the American Heart Association (AHA), the American Red Cross (ARC), and a variety of corporate and governmental agencies (McIntyre, 1980).

A high level of competency in CPR must be maintained at all times for CPR to be administered safely and effectively. The length of time that adequate CPR skills are retained after initial training is still uncertain (Weaver, 1979). This study will attempt to investigate if the method of instruction affects retention of CPR psychomotor skills.

Each community's needs and resources must be considered before instructors can determine which teaching method is most appropriate. To date, little documentation exists supporting the adequacy of any particular CPR teaching strategy in promoting maximal skill retention.

Presently AHA and ARC standards require recertification yearly, which increases demand on course instructors and prompts the examination of current methods of instruction. If participants could learn equally well by the use of modular self-paced methods it would facilitate the training of CPR. By eliminating repetitive lectures the modular self-paced approach would decrease the time committment of instructors as well as provide flexibility for participants. The

modular approach would also provide a presentation of material to each participant reducing the evidence of burn-out of instructors (Lange, 1982). More professional educators could consider the feasibility of self-paced instructional learning packages as a viable alternative to traditional instructional modalities. Incorporating self-instruction in the CPR curriculum could result in substantial savings in time, materials, and staff salaries.

In the future, instructors may become obsolete. In the meantime, however, the modular self-paced courses remain an excellent option for teaching a large number of people with maximal instructor effectiveness.

Statement of the Problem

The purpose of this study is to test the effect of two teaching methods: lecture-demonstration-return-demonstration and a modular self-paced method, on the retention of CPR cognitive knowledge and psychomotor skills of the lay community three months after completion of the class. The primary question to be examined is: does the method of instruction affect retention of Basic Cardiac Life Support knowledge and skill?

Hypotheses

To test whether the method of instruction affects the retention of Basic Cardiac Life Support knowledge and skill the following null-hypotheses were posed:

1) There is no difference in the Retention Scores on the one-rescuer CPR knowledge exam between subjects who learned CPR using the modular self-paced format and subjects who learned CPR using the traditional lecture format.
2) There is no difference in the Retention Scores on the one-rescuer CPR psychomotor skill exam between subjects who learned CPR using the modular self-paced format and subjects who learned CPR using the traditional lecture format.
3) There is no difference in the Retention Scores on the one-rescuer CPR procedure exam between subjects who learned CPR using the modular self-paced format and subjects who learned CPR using the traditional lecture format.

Assumptions

The following assumptions were made to simplify the examination of the problem:

1) Participants in the modular self-paced CPR course and participants in the lecture format CPR course did not interact and discuss material during the study.

2) Participants did not practice on the CPR manikins or review CPR material during the study.
3) Participants have answered the CPR questionnaire correctly.

Delimitations

The following delimitations were made to simplify the examination of the problem:

1) The study was delimited to the general public in the LaCrosse, Wisconsin area.
2) The study used only American Heart Association trained instructors to insure that all participants received similar training.
3) Since all BLS courses used in the study were taught in the CPR classroom at LaCrosse Lutheran Hospital similar results may not be obtained in other settings.
4) The study involved only the people who completed the six-hour Basic Life Support courses between April 22 and July 24, 1986.

Limitations

The factors which compromise, confound, or inhibit the validity of this study are:

1) The three month research period used in the study may not have been enough time to note significant differences in CPR psychomotor performance and BLS Program skill retention.

2) The small number of subjects in the study could have skewed the data analyzed.

Definition of the Terms

Basic Cardiac Life Support. The external support of the circulation and respiration of a victim of cardiac arrest through cardiopulmonary resuscitation or the prevention of circulatory or respiratory arrest through prompt intervention.

Cardiopulmonary Resuscitation. The opening and maintaining of patient airway, providing artifical ventilation by means of rescue breathing and providing artifical circulation by means of external cardiac compression.

Lecture-Demonstration-Return-Demonstration. The traditional classroom approach in which the content is presented and controlled by the instructor. This approach includes the use of a film and demonstration of one-rescuer CPR, two-rescuer CPR, infant resuscitation, and obstructed airway maneuver on an adult and infant. All learning materials were obtained from the AHA.

Modular Self-Paced Method. The teaching approach that allows the student to utilize available resources to meet objectives using as much time as necessary to reach a preset level of achievement. Study materials included slide-tape content developed by Laura Wiedman and Kathy Collins and CPR instructor-trainer and student workbooks based on criteria from the American Heart Association. Four recording manikins

(Recording Resusci-Anne:Laerdal), and two infant manikins (Resusci Baby:Laerdal) were available for practice of psychomotor skills.

Psychomotor Skills. The active procedures involved in cardiopulmonary resuscitation in accordance with the standards established by the American Heart Association. This includes the use of the seven step CPR and Emergency Cardiac Care Performance sheet for one-rescuer CPR and two-rescuer CPR.

Retention Scores. The number of sucessfully completed skills in the pretest (which is always 11) minus the number of sucessfully completed skills in the post test, which reflects the retention of skills.

CHAPTER II

SELECTED REVIEW OF RELATED LITERATURE

The selected review of related literature will include the following three areas: 1) The general importance of CPR; 2) Retention of Basic Cardiac Life Support knowledge and skill; and 3) The effect of method of instruction on retention.

General Importance of CPR

CPR initiated soon after cardiac arrest substantially increases the long-term survival rate of victims (Murphy, 1984). Demonstration of lay CPR effectiveness, coupled with the realization that most out-of-hospital cardiac arrests will be observed by non-medical personnel, have provided strong reasons for widespread citizen CPR training.

It has been suggested that a 20 percent CPR training prevalence among adults might be adequate to substantially reduce morbidity and mortality resulting from out-of-hospital cardiac arrests (Selby et al. 1982). CPR has been transformed from a technique taught only to health care professionals to one enlisting the skills of thousands of lay persons who have been trained to perform life-saving maneuvers on victims of cardiac arrest. Through the years, the techniques have been refined as researchers and clinicians have worked to make the procedure more effective. As a result, CPR standards and guidelines have been

revised several times to permit incorporation of improved understanding and techniques as they become available. Questions continue to be asked regarding how CPR works and also how well. The AHA and other groups currently plan to continue the CPR training effort as a major goal until at least 20-25 per cent of the population is certified in CPR. Lives have been saved with CPR techniques applied promptly and correctly (Gombeski, Effron, Ramirez and Moore, 1982). The American Heart Association estimates that, if enough citizens were trained in CPR, between 100,000 and 200,000 lives could be saved each year in the United States alone (JAMA, 1986).

To gain an understanding of our present day CPR technique a brief historical investigation is necessary. In 1960 Kouwenhoven et al., introduced the closed-chest massage technique to sustain life. Using skills that require only the two hands and no equipment, their technique became successful in sustaining a heart that was not beating effectively. Since the publication of their life saving technique, the art and science of cardiac medicine has continued to grow. By applying the skills learned that enable the restoration of breathing and circulation lives of victims of choking, drowning, and heart attacks are being saved (Kouwenhoven et al. 1960).

In 1966, a National Academy of Sciences-National Research Council Conference on CPR recommended the training of medical, allied health, and professional personnel using the external chest compression technique according to the standards of the AHA (JAMA, 1984). That recommendation lead to the widespread acceptance of the theory and

technique of CPR among health care professionals. The Conference recognized that the performance of CPR continued to develop through on-going experience and research with improved understanding and techniques incorporated as they become available. The Conference offered a clear definition of what is intended by the terms: standards, guidelines, and certification, emphasizing that there is no intent to limit new concepts or advances.

Historically the AHA and the ARC indicated that because of its medical nature, CPR should only be applied by carefully trained medical personnel and not the general public, and that further training should be for physicians, dentists, nurses, and specially qualified emergency rescue personnel. In 1973, a National Conference on Standards for CPR, co-sponsored by the AHA made recommendations that the CPR training programs be extended to the general public based on the realization that respiratory and cardiac arrests are emergencies for which all persons, even children, should be able to initiate treatment. Although the general public was being trained it was felt that the training, certification, and delivery of basic and advanced life support must be in accordance with the standards of the AHA (1980) and that the association continue to review scientific data and clinical experience and revise and update the standards on the basis of the information gathered. These programs incorporating continuing education have capitalized on the public's enthusiasm for CPR. In 1967 the AHA committee on CPR developed programs to teach external cardiac compression to the lay public. Since the introduction of the

closed-chest cardiac massage technique by which anyone with training, using only their two hands, can save a life, many of the nearly 1,000 pre-hospital sudden deaths per day in the United States alone have been prevented (JAMA, 1986). By providing a mechanism for community penetration, the basis of CPR responsibility has shifted from health care professionals to persons within the community where the incidence of sudden death occurs with the greatest frequency. The role of a bystander has proven indispensable to the optimal implementation of resuscitative efforts directed toward the prehospital cardiac arrest victim. Success depends on the layman's willingness to initiate CPR promptly and ability to provide it effectively (Trounson, 1984). Responsibility for providing these lifesaving techniques is considered to be primarily within the public community. It is the responsibility of the medical community, specifically individuals certified in CPR, to educate the public and provide support (Swendson, 1981).

Retention of Cardiac Life Support Knowledge and Skill

Evaluation of BLS performance using AHA recommended standards has indicated that on completion of the four-hour course, lay adults had mastered the cognitive information and sequential steps necessary to prepare a cardiac arrest victim to receive CPR, but they were unable to perform satisfactorily the ventilations and compressions (Winkelman, 1980). Assessments conducted three and twelve months after instruction indicated a deterioration of skills (Nelson, 1985). Questions of concern to CPR educators are: (1) how much skill deterioration occurs

and (2) whether review of course materials or manikin practice affect knowledge and skill retention. To address these questions, the lay public needed to be evaluated three months after completion of the BLS course to determine the degree to which CPR knowledge and performance skills, based on AHA recommended standards were retained.

In a 1983 Providence, Rhode Island study, Rallis et al., randomly selected 265 persons to study trainee retention of CPR. Initially CPR skills were taught to the general public using the AHA course. The goals of Rallis et al., were to determine knowledge and skill retention at four and twelve months and to compare the success of the different instructional formats. The paper discussed some unique and unusual aspects of the methodology and testing procedures which made this study a useful model for anyone wishing to measure retention. Observers were especially concerned with monitoring whether the course could be taught in a uniform way, with all instructors following standard procedures regarding content, timing, sequence and techniques. Observations did reveal variation in the instruction provided.

Subjects' performance was assessed both by an examiner using a checklist and by recording manikin tapes. When the results of the two assessments were compared, instructors rated at least twice as many of the same subjects as performing adequately as did the manikin tapes in the four critical areas of ventilations, pulse check, compression, and rate and ratio. Subjects were expected to meet 100% of the established criteria both on the written test and the skill performance test.

Results from the four month study indicated that few subjects meet 100%, thus, indicating that retention is poor. Yet, subjects were able to perform correctly the steps and sequences involved in CPR about 50% of the time and answered written test items correctly about 80% of the time. Results for the twelve month study were similar.

To summarize, the inclusion of systematic observations as a part of the methodology for the study yield dramatic insights into what actually occurs when volunteer instructors provide CPR training to the general public. Furthermore, the study raised three testing issues: (1) the relibility and validity of a checklist which depends upon instructor judgements, (2) the potential lack of uniformity in administering the assessments, and (3) whether the current standards for success should be re-examined.

The AHA and ARC wanted to add rigor to their approach for answering the question of CPR retention, so they retained an educational research establishment, The Center for Evaluation and Research of Rhode Island College, for technical assistance. Together, according to Rallis (1984), the three organizations designed a model treatment course which emphasized hands on practice, that combined CPR skills using the American Heart Association "Heart Saver" and the American Red Cross "Race for Life" courses. Based on learning theory and educational principles, seasoned CPR instructors were taught the treatment course and their performance in providing CPR training was monitored. This allowed for a comparison of the two assessments resulting in a uniform assessment for both the instructor rating and manikin tapes.

Observers were especially concerned with determining whether this revised treatment course could be taught in a uniform way, with all instructors following standard procedures regarding content, timing, sequence, and techniques.

To measure retention systematically, new instruments for both skill performance and knowledge were developed. The same testing instruments were used three times during the study: immediately after training for 2,216 participants; at the four-month refresher sessions for 152 subjects; and at the twelve-month refresher sessions for 113 subjects.

Instructors who presented the treatment course at the original session and who trained and tested subjects at the four and twelve month refresher sessions received intensive training in the use of skill sheets. These instructors were then referred to as examiners, and their testing of subjects was monitored. Observations indicated that there was sufficient uniformity in the testing procedures used to provide valid test results.

Subjects' performance was assessed both by an examiner using a checklist and by recording manikin tapes. When the results of the two assessments were compared, instructors rated at least twice as many subjects to be performing adequately as did the manikin tapes.

The results of the written test and the skill sheets were analyzed using a computer program which provided breakdowns for each subset of objectives, within rescue breathing, one-person CPR, and the written test. Subjects were expected to meet 100% of the established criteria. Results from the four month study show that few subjects

meet 100%, thus, indicating that total retention is poor. Yet, subjects were able to perform correctly the steps and sequences involved in CPR about 50% of the time and answered written test items correctly about 80% of the time. Results for the twelve month study were similar.

To summarize, the inclusion of systematic observations as a part of the methology for the study yield dramatic insights into what actually occurs when volunteer instructors provide CPR training to the general public. Second, developing a set of testing instruments that could be used by three different programs provided a means of comparing the results of these different instructional formats. Furthermore, according to Rallis (1984), the study raised three issues: the reliability and validity of a checklist which depends upon instructor judgments, the potential lack of uniformity in administering the assessment, and whether the current standard for success should be re-examined.

In a Bowling Green, Ohio study, 45 subjects from a variety of academic pursuits who volunteered for CPR training, were randomly assigned to a modular training format (Lewis, 1984). This study sought to examine whether the modular training method provides learners with a mastery level of retention in the cognitive and psychomotor domains. The study also examined the learners' perception of their ability to perform these lifesaving skills. Upon completion of training, subjects were administered criterion cognitive and skill performance assessments for certification. Subjects were randomly assigned to either the

three, six, or nine week retention testing interval. Retention testing consisted of the same performance assessments used for certification. A dramatic drop in the retention of CPR cognitive and psychomotor performance occurred within the instructional group over retention intervals. After a testing interval of nine weeks the CPR modular instructional group exhibited ineffective CPR performance. Based on the findings of this investigation and its predecessors, serious consideration need be given to shortening the time interval for CPR recertification.

The Effect of Method of Instruction on Retention

Learning experiences would seem to be more valuable if the individual were able to remember them for a reasonably long period. Retention is essential if the individual is to put to use what has been learned. If the information cannot be accurately recalled on the appropriate occasion, the time spent in learning it has been wasted. In regard to CPR the cardiac arrest victims' life may depend on that appropriate application. As the average lay person encounters cardiopulmonary emergencies rarely, retention and retraining considerations become serious problems.

Slothus (1983) conducted a study to compare methods of teaching a Radiographic Anatomy and Positioning course to radiologic technology students randomly assigned to experimental and control groups. The experimental group was taught by a self-instructional method, and the control group was taught using traditional lecture instruction. Both cognitive and practical competencies were examined.

The guiding hypothesis for this research was that no significant statistical difference would appear in cognitive scores and practical competencies between students who are taught radiographic positioning through self-instruction versus students who are taught through a traditional lecture methodology. An f-test revealed a significant difference between the experimental and control group cognitive and practical competencies at the 0.01 level. A two-tailed t-test comparing the two independent means indicated that there was a significant difference in cognitive scores and practical competency scores between the experimental and control groups at the 0.01 level. Since the difference between the scores was statistically significant the investigator confirmed that there is an overall difference between knowledge and/or preparation between the two groups with a better result from students learning through self instruction.

The first self-instructional course to teach lay persons CPR was designed for the Red Cross (ARC, 1980) by Communication Research Laboratories, Inc. and published in 1975. The subject-matter was based on information provided by the Division of Medical Sciences, National Academy of Sciences-National Research Council (JAMA, 1980). The AHA cooperated in setting compatible technical standards for AHA and ARC materials. Since the first CPR module was developed, a number of revisions have been carried out to update materials to correspond with revised standards. The revised standards include: (1) The development of teaching materials that were for the most part entirely consistent

in BLS, thus minimizing the chance of either professional or public confusion. (2) Implementation of the recommendations and conceptual materials by the AHA, resulted in the development of a teaching and testing mechanism for courses that can now be conducted nationwide. (3) Criteria for certification resulted in a method of ensuring quality control by providing an objective threshold for defining the adequacy of cognitive and performance skills of course participants. Each module is intended to have flexibility to be used either alone or as part of a larger course. Field trials have shown that not only has the self-instructional format answered the need for a short one-rescuer CPR course but also, this method has produced desirable short-term behavior (JAMA, 1986). Practical experience with re-certifying students who have studied CPR modular courses in the past shows that students do indeed remember large portions of their initial instruction (JAMA, 1986).

Wilson, Brooks and Tweed (1982) trained and tested nine hundred and fifty employees of the Manitoba Telephone System at the Basic Rescuer level on recording manikins. All individuals trained did not differ in performance level achieved during training, or in time interval between training and retesting. In 1981 a random group of 40 were then retested without warning on the recording manikin. Forty percent of those retested were able to perform effective ventilations and compressions with 60% to 70% average retention compared to their training scores. The remaining 60% had ineffective ventilations or compressions or both. The experimental design indicated that there are

many poorly understood factors that may influence skills retention, including method and intensity of initial training, motivation, reinforcement or retraining, and opportunity for use. The study concluded that until important questions concerning training methods and effectiveness of performance are answered, efforts might be better directed toward other aspects of public education.

In a study based on a sample of Minneapolis-St. Paul area adults Murphy et al. (1984) indicated that there are substantial decreases in CPR knowledge and skill levels as early as three to six months after training. The findings indicated that if CPR training programs are to have their intended effects, then either better training programs must be developed or incentives to maintain competency levels identified.

Mandel (1985) conducted a pilot study to examine the validity and reliability of the American Heart Foundation/Actronics Inc. interactive videotape system for CPR as a citizen teaching method. Specifically, the pilot study addressed the following questions: 1) Is there a significant difference in the performance scores between the experimental group and the control group? 2) Is there a significant difference in gain score on the written test between the experimental group and the control group? 3) Is there a significant difference in retention of learning (written test) at three months between the experimental group and the control group? 4) Is there a significant difference in retention of learning (performance score) at three months between the experimental group and the control group? 5) Is there a significant difference in initial learning time between the experimental group and the control group?

The pilot study was undertaken with subjects drawn from the urban officies of a major Alberta, Canada Oil Company. The subjects self-selected into control and experimental groups. The control group was taught in the usual manner by instructor while the experimental group was taught solely by the videodisc system. The research design included a cognitive pretest, cognitive and skills post test, and cognitive and skills retention test at three months. The results of these measures were subjected to appropriate descriptive and inferential statistical methods for small samples. The results of the pilot study demonstrated trends that indicate the long term benefits (in terms of time, learning, and retention) of the videodisc CPR system in providing instruction to the lay community.

In a similar study Murray (1982) designed a study to determine if participants could be taught BLS skills by video cassette without manikin practice as is the more conventional approach. If these participants could learn equally well by video cassette without manikin practice and could pass the BLS practical examination with minimal time committment on their part it would facilitate the training of several hundred particpitants yearly. By eliminating repetitive lecture and practice sessions, this approach would decrease the time committment of instructors as well as participants. The results indicated that the use of video cassette tapes to teach and reteach BLS in a selected group can expedite training and certification and decrease burn-out in the group of instructors.

Friesen and Stolts (1984) conducted a study to determine the impact of two teaching methods on the retention of BLS knowledge and skill. The teaching methods studied were a traditional lecture method and a self-paced method.

The sample consisted of 63 baccalaureate nursing students who were assigned to one of the two teaching methods. AHA instructional materials and cognitive and performance tests were used with both treatment groups. The results indicated that cognitive knowledge was retained at a mastery level by both groups at eight weeks but neither group was able to demonstrate retention of performance skills at a mastery level. Examination of the retention scores showed that poor performance was distributed over all categories of CPR activities and as subjects in the experimental group had no direct faculty supervision of CPR practice while those in the control did, it is clear that the level of psychomotor performance is not directly related to faculty supervision. The study concluded that further investigation is needed in the area of retention of psychomotor skills and that it may be that some other type of teaching tool or method might be needed to aid retention. The study further concluded that maintenance costs for the self-paced method are projected to be much less and that further cost containment could be facilitated by having students purchase the workbooks.

Summary

In conclusion, since victims of cardiac arrest have a more favorable outcome when CPR is immediately and properly applied, it is important to insure adequate retention in individuals who have learned CPR. The purpose of this chapter was to gain insight into the benefits and effectiveness of CPR. A review of the literature, revealed that most studies demonstrate the effectiveness of CPR in saving lives when performed according to established standards. However, considerable research indicated that the retention of CPR knowledge and skills depends on the frequency of performance and instructional format.

CHAPTER III

METHODOLOGY

Introduction

The purpose of this study was to assess whether or not the method of instruction would affect the retention of one-rescuer CPR Psychomotor Performance and BLS Program skills three months after completion of the class. The primary question examined was: will individuals who have received the modular self-paced method show a significant increase in retention of one-rescuer CPR psychomotor performance when compared to the traditional method?

Subject Selection

The Department of Education at LaCrosse Lutheran Hospital in conjuction with the Wisconsin Heart Institute developed and distributed a brochure (Appendix A) along with local media advertising, to create an awareness of CPR class offerings to the general public. The study involved 100 residents from the area in and around LaCrosse, Wisconsin. The sample population (Appendix B) consisted of 12 males and 13 females. The sample population age range was 26-35 with a mean age of 30. Interested individuals called the hospital to sign up for a class. No screening or qualifications were necessary before receiving the training. Because LaCrosse Lutheran Hospital offers CPR instruction each month for those who want to learn this lifesaving skill, it was decided to

alternate each class between the traditional lecture format and the modular self-paced format. A postcard (Appendix C) was sent one week in advance of the class to remind each participant of their registration. Each six-hour CPR course included handouts, practice time and performance evaluation. Anyone 12 years and older was invited to register for a class. No fee was required. Persons completing the course earned a one-year BLS certification through the American Heart Association.

For purposes of retesting three months following the initial class, participants were sent a letter (Appendix D) reminding them of their previously decided date and time for a return demonstration of a CPR skill sequence. Participants were not told which sequence they would be demonstrating and were informed not to prepare. A telephone follow-up was used to remind the participants of the letter that had been sent and again reminded them of the follow-up skills demonstration.

Instrument

The instrument used to assess retention of one-rescuer CPR psychomotor performance skill was the American Heart Association's "Cardiopulmonary Resuscitation and Emergency Cardiac Performance Test for One-Rescuer CPR" (Appendix E). The instrument made use of the indicator light to validate that lung inflation is sufficient and chest compression is adequate, along with the evaluator's observation of the

participants performance. It is desirable for training devices to provide an objective means by which the student and instructor can determine correctness of lung inflation and chest compression and recognize mistakes in hand positions. The instructor's emphasis was on direct observation and critique of student performance.

Procedures

Prior to initiation of the study, approval was obtained through the LaCrosse Lutheran Hospital's Human Investigation Committee (Appendix F). Participants were informed that data obtained from the course in BLS would be used for research purposes and that the purpose of the study was to compare two methods of teaching.

In a classroom setting, the experimental group received a ten-minute orientation to the modular self-paced program. The CPR instructor explained that a module describing the purpose and objectives of BLS had been developed; each participant received a copy of this written material. The self-instructional workbooks (Appendix G) will be circulated to each participant and resources available will be described. The participants were informed that a slide-tape series which provides skill demonstration and manikins are available in the learning center for use. Participants were instructed to view the slide series, practice on the manikins, and then give a return demonstration to the CPR instructor. Based on past studies particpants do not successfully complete the course when they did not use the

materials. Participants were informed of the test date and that retesting would take place in three months.

In a second group, a 30-minute film with lecture provided the BLS content. The lecture format and film content are based on the standards for BLS from the AHA. Two hours were spent in a demonstration of all BLS skill sequences. Participants were informed that manikins were available for practice and were encouraged to practice. The information given regarding testing was the same as that provided to the experimental group.

Data Collection

At the initial CPR class three certified CPR instructors will administer a psychomotor skills test and 50-item multiple choice pretest (Appendix H) regardless of the teaching method. At the three month follow-up session only psychomotor skills were tested. The participants were expected to establish the need for and to perform the proper sequence of a one man rescuer CPR situation.

Inter-rater reliability was established prior to the testing sessions. Each CPR instructor was observed and evaluated five CPR students. The CPR instructor's had to obtain 100 percent agreement for each of five students. The situation for each student was a one-rescue CPR sequence in which an 11 step logical flow sheet had to be followed. The instructor will be advised to give only a pass or a

fail response for each sequence (Appendix E). This removed the researcher's doubts about the instructor's ability to evaluate the participants in the study.

Another CPR instructor served as evaluator for the retesting session. The researcher taught and evaluated the BLS Program classes but did not evaluate the participants during the retesting session because of the potential bias which could be created by having the researcher serve as the sole evaluator.

The criterion for successful retention was established by the CPR Technical Committee of LaCrosse Lutheran Hospital. The committee remained consistent with the AHA recommendations which require each participant to attain ninety percent accuracy on the CPR performance skills as determined by the manikin read-out.

The statistical technique chosen for examining the hypotheses was the independent groups t-test. This test was used to analyze the data because the dependent variable retention scores (the number of successfully completed skills in the pretest, which is always 11, minus the number of successfully completed skills in the post test) which reflects the retention of skills is quantitative in nature and is measured on an interval scale and the independent variable the teaching format (modular self-paced versus traditional classroom instruction) is between subjects in nature with only two values.

For the individual t-tests, the level of alpha chosen was 0.05. The strength of the relationship will be analyzed using the eta squared statistic. Finally, the nature of the relationship was determined by

examination of the mean scores in the two sessions characterized by the type of teaching format. Hypothesis one, two and three regarding participants passing the one-rescuer CPR psychomotor performance and BLS Program skills three months following one of the teaching methods, were tested using retention scores, calculation based upon the ninety percent criterion. From the interval data collected, a retention score between the post test and pretest for each participant in each teaching method was obtained. When retested, after three months, if more of the participants in the modular self-paced format than the lecture format again passed with a ninety percent success rate the researcher concluded that successful retention of one-rescuer CPR psychomotor performance skills and BLS Program skills had been attained.

CHAPTER IV

Results and Discussion

Introduction

In this chapter, data analyses are discussed to determine if teaching format significantly affected retention. Each hypothesis with its statistical data will be presented along with a discussion of the significance of the findings.

Subjects and Results

Seventy-five residents from the LaCrosse area signed up for the CPR classes. From this group twenty-five participants, 12 males and 13 females, completed the requirements of the study.

The pretest and post test was administered to individuals, scored and the results were catagorized according to a one-rescuer CPR skill sequence established by the AHA, Heart Saver Module Criteria (1982) (Appendix G). Table 1 shows the percentage comparisons of skill sequence performance for the two groups.

Subjects were divided into two groups according to teaching format: traditional and modular self-paced. At the initial CPR class participants were administered a psychomotor skills test and 50-item multiple choice pretest regardless of the teaching method. At the three month follow-up session only psychomotor skills were tested.

Data was analyzed using the independent groups t-test; the dependent interval/ratio variable was defined as retention scores (the number of successfully completed skills in the pretest, which is always 11, minus the number of successfully completed skills in the post test, which reflects the retention of skills); the independent variable was the teaching format (modular self-paced versus traditional classroom instruction).

The hypotheses are presented, analyzed, and discussed according to the following procedure: Each hypothesis has been stated, followed by a table of descriptive data, the statistic used, a discussion of analysis and results, and a statement of conclusion regarding rejection or acceptance of the hypothesis.

Summary of Results

Analysis of the statistical results indicates that:

(1) There is a difference in the retention scores on the one-rescuer CPR knowledge exam between participants who learned CPR using the modular self-paced format and participants who learned CPR using the traditional lecture format.

(2) There is a difference in the retention scores on the one-rescuer CPR psychomotor skill exam between participants who learned CPR using the modular self-paced format and participants who learned CPR using the traditional lecture format.

(3) There is a difference in the retention scores on the one-rescuer CPR procedure exam between participants who learned CPR using the modular self-paced format and participants who learned CPR using the traditional lecture format.

Table 1 shows the percentage comparisons of skill sequence performance by teaching method. Participants were divided into two groups according to teaching format and as shown by the table there is a significant difference between the traditional and modular self-paced participants especially when looking at the following skills: check for pulse, find correct hand position, deliver 4 cycles of compression and ventilation (15:2), recheck pulse/breathing and resume CPR.

Table 2 shows the biographical information of the participants by teaching format. Because LaCrosse Lutheran Hospital offers CPR instruction each month for those who want to learn this lifesaving skill, it was decided to alternate each class between the traditional lecture format and the modular self-paced format. From the table there is a significant difference in the previous CPR experience of the traditional group when compared to the modular self-paced group.

A t-test was performed comparing the means of the two groups. The t was statistically significant ($t=-3.50$, $df=19$, $p<.05$), indicating that the mean retention score for the modular self-paced group (6.9) was significantly higher than the mean retention score for the traditional group (3.1). The conclusion that can be drawn from the data is the statement "the t-test was statistically significant" indicates the null hypothesis can be rejected.

TABLE 1

Percentage Comparisons Of Skill Sequence

Performance By Teaching Method

Skill Sequence	Teaching Format			
	N=15		N=10	
	Traditional		Modular Self-Paced	
	%		%	
	Yes	No	Yes	No
a) determine unresponsiveness	100		100	
b) call for help	60	40	60	40
c) open air way	87	13	90	10
d) check for breathing	87	13	80	20
e) deliver 4 initial breaths	74	26	80	20
f) check for pulse	67	33	80	20
g) activate EMS System	47	53	40	60
h) find correct hand position	80	20	40	60
i) deliver 4 cycles of compression and ventilation (15:2)	53	47	80	20
j) recheck pulse/breathing	67	33	80	20
k) resume CPR	67	33	90	10

TABLE 2

Biographical Information Of

Participants By Teaching Format

Traditional

N=16 Males=8 Females=7

Age Group: 17-25=27% 26-35=40% 36-45=13% 46-55=0% 56 & over=20%

Previous CPR Experience: Yes=93% No=7%

Certified By: ARC=27% AHA=73%

Modular Self-Paced

N=10 Males=4 Females=6

Age Group: 17-25=10% 26-35=50% 36-45=30% 46-55=0% 56 & Over=10%

Previous CPR Experience: Yes=50% No=50%

Certified By: ARC=50% AHA=50%

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of the study was to test the effect of two teaching methods; traditional lecture and modular self-paced method, on the retention of CPR cognitive knowledge and psychomotor skills of the lay community. Participants were administered a psychomotor skill pretest and a follow-up psychomotor skill post test three months following one of the teaching methods.

The participants in this study were twenty-five volunteers, 12 males and 13 females, from the LaCrosse area during April through October 1986. The participants were divided into two groups by teaching format. At the time of registration the participants were not informed as to which teaching format they would be taught. This ensured that by a randomization process each teaching format would have an equal chance of having participants with similar CPR backgrounds.

After successful completion of the six hour CPR course participants were certified in accordance with the guidelines established by the AHA. At the end of the three month period participants were asked to return and demonstrate a previous successful skill sequence.

Analysis of the data, indicated that the two teaching formats (traditional lecture versus modular self-paced) exhibited a significant difference in retention scores at the 0.05 significance level.

An independent groups t-test was used to analyze the hypotheses. In all statistical comparisons the statistical significance was chosen to be 0.05. A descriptive method of data analysis was also used.

Threats to the Study's Validity

Before the conclusions are stated, the researcher must acknowledge the following possible threats to the validity of the study and the results of the data analysis.

The study's small sample size resulted in only twenty-five subjects. Because of the small sample size any effect on the data had more of a statistical impact. The study's small sample size did not permit an equal distribution of males to females or equal representation of previous CPR exposure. As a result, the study's subjects were predominately young females who had little or no previous CPR exposure.

The study relied on LaCrosse area resident volunteers as participants, who had different reasons for volunteering for the study and different exposure levels to CPR.

For the purpose of retesting three months following the initial class, participants were not told which sequence they would be

demonstrating and were informed not to prepare before the post test. These individuals were not monitored as to their compliance with these instructions.

Conclusions

Based on the findings of the research and acknowledging the possible threats to the validity of the study, the following conclusions are stated with caution.

(1) There was a difference in retention scores between participants on post test whether they had the traditional lecture format or the modular self-paced format.

(2) The difference in pretest and post test on the 11 step skill sequence was able to be established by the researcher.

Possible Explanations

There are a number of possible reasons why participants were more effective at retention when taught by the modular self-paced format a technique that was opposite their preferred mode of learning:

(1) Participants may find a particular teaching format conforming to their learning style easy to understand and execute.

(2) Participants may find the teaching technique opposite their preferred way of learning confusing and as a result not know exactly how to use it.

(3) Participants may find the teaching format that is opposite their preferred mode of learning novel and therefore more interesting than their preferred and accustomed way of learning.

Recommendations

Based upon the findings and limitations of this study, the following recommendations have been made:

(1) A similar study should be conducted involving a larger group of participants with the number of males and females relatively equal.

(2) If possible, techniques of recruiting participants should be used to obtain an equal number of participants with similar previous CPR backgrounds.

(3) A similar study should provide some form of review session to the participants during the three month period so that skill retention may be possibily increased.

(4) Similar studies should be conducted involving additional adult populations to provide a sample that is more representative of the population at large.

(5) Additional studies should address the younger and the older populations in the LaCrosse area.

(6) Similar studies should measure both skill sequence and knowledge base at three month, six month and one year intervals.

Final Comment

The study was of some benefit to the Department of Education at LaCrosse Lutheran Hospital but as we all know the AHA has announced some significant procedural changes in the one-rescuer skill sequence and the elimination of the two-man skill sequence in its standards specifically for the lay community.

Health educators can be more effective at teaching these important CPR skills to the general population if they understand the relationship between learning preference, the retention of material and the ability of individuals to incorporate the skill into their daily lives. Personality types of each participant should also be considered when using a particular teaching format.

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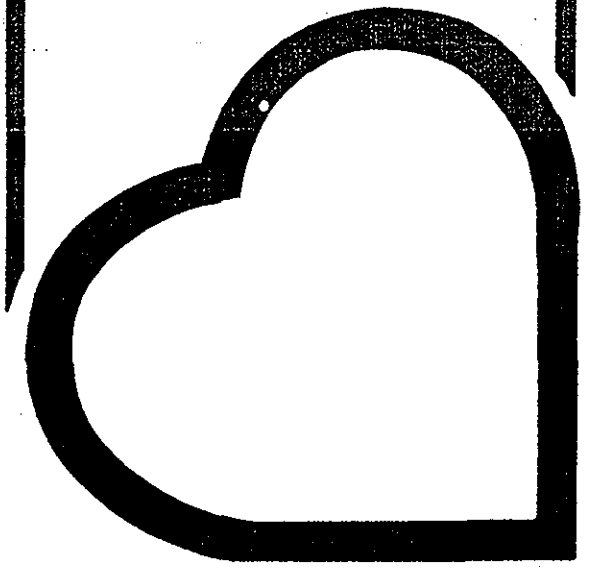
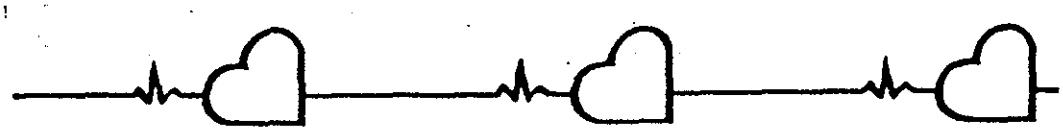
APPENDIX A

Learn about the ABC's of CPR



La Crosse Lutheran Hospital
La Crosse, WI



What would you do:

If you were at your favorite restaurant enjoying a meal and someone at the next table began to choke. Would you
a) keep eating
b) faint
c) scream
d) become the first responder

If you were strolling around your neighborhood and you saw someone collapse in their front yard. Would you
a) look for help
b) continue your walk and hope no one had seen you
c) hope someone comes along who can help this person
d) become the first responder

(the correct answer for both questions is D)

It is estimated that 650,000 individuals die from heart attacks each year. About 350,000 of these deaths occur within 2 hours after the onset of symptoms. Over 40 percent of these victims could be successfully resuscitated if prompt action through cardiopulmonary resuscitation (CPR) is begun.

You can improve the quality of life in your community by becoming a first responder and learning the ABC's of CPR.

The ABC's represent:
A - airway
B - breathing
C - circulation

These three words serve as guidelines for the CPR procedure, which is a basic life support system combining external chest compression with artificial respiration. It is meant to give an unconscious person the necessary circulation of oxygenated blood to sustain life until advanced life support is available.

Emergencies where the ABC's of CPR are needed include:
- heart attacks
- drowning
- choking
- suffocation
- electrocution
- accidents

La Crosse Lutheran Hospital offers CPR instruction each month for those who want to learn this lifesaving skill. Persons completing the American Heart Association course will learn:

- Education for a healthy lifestyle
- Ways of entering the emergency medical system
- Signs and symptoms of a heart attack
- Training in how to help a choking person
- Training in cardiopulmonary resuscitation (CPR)

Each six-hour CPR course includes handouts, lecture, demonstration, practice time and performance evaluation. Anyone 12 years and older is invited to register for classes. A small fee is required, with persons completing the course earning a one-year CPR certification through the American Heart Association. Class size is limited. It is suggested that casual clothes be worn

For more information on the CPR class offerings, call the Department of Education at La Crosse Lutheran Hospital, (608) 785-0530, ext. 3194 or 3098.

DATES FOR C.P.R. CLASSES 1986

January 28 & 30	6:30-9:30 p.m.
February 25 & 27	6:30-9:30 p.m.
March 25 & 27	6:30-9:30 p.m.
April 23 & 24	6:30-9:30 p.m.
May 20 &22	6:30-9:30 p.m.
June 24 & 26	9:00 a.m.-12:00p.m.
July 22 & 24	6:30-9:30 p.m.
August 26 & 28	6:30-9:30 p.m.
September 23 & 25	6:30-9:30 p.m.
October 28 &30	9:00a.m.-12:00p.m.
November 11 & 13	6:30-9:30 p.m.
December 2 & 4	6:30-9:30 p.m.

FOR RESERVATIONS CALL:

LA CROSSE LUTHERAN HOSPITAL
785-0530, Ext. 3194
DEPARTMENT OF EDUCATION

APPENDIX B

Informational Letter

La Crosse Lutheran Hospital Department of Education CPR Classes

We are conducting a CPR Retention Study to evaluate two different teaching formats. If you are interested in participating, you will be required to return in 3 months for a skill demonstration. This will not affect your certification.

Please complete the following:

NAME:_____

ADDRESS:_____

CITY:_____ STATE:_____ ZIP:_____

PHONE:_____ MALE:_____ FEMALE:_____

AGE GROUP: 17-25_____ 26-35_____ 36-45_____ 46-55_____ 56 & over_____

Have you ever had CPR before: Yes_____ No_____

How many time? Once_____ Twice_____ Three or more_____

How long ago? 1-2 years_____ 3-4 years_____ 5 or more years_____

Where was the class?_____

Were you certified by:

American Red Cross _____

American Heart Association _____

Other (specify)_____

Type of format that was used to teach the class:

Lecture with Instructor demonstration_____

Modular, self-paced approach_____

Other (specify)_____

DO NOT WRITE BELOW THIS LINE

Return Date:_____ Time:_____

La Crosse Lutheran Hospital Department of Education CPR Class

At 3 months the skill demonstration will take about 15 minutes of your time. NO preparation before hand, please. You will be asked to demonstrate one CPR skill sequence on a manikin. We will try to schedule the follow-up at your convenience. Please see you CPR Instructor. A reminder will be sent to you.

Return Date:_____ Time:_____

THANK YOU FOR YOUR PARTICIPATION

APPENDIX C

Wisconsin Heart Institute

A REMINDER

You are registered for a CPR class on

_____.

If you are unable to attend, please contact the Department of Education at La Crosse Lutheran Hospital (608) 785-0530, ext. 3194. Thank you.

1910 South Avenue, La Crosse, Wisconsin 54601

APPENDIX D

LA CROSSE LUTHERAN HOSPITAL

1910 SOUTH AVENUE / LA CROSSE, WISCONSIN 54601-9980 / (608) 785-0530

June 19, 1986

Dear

At the time that you attended CPR classes, you volunteered to participate in a CPR Retention Study.

It has been three months since your certification. Your scheduled return demonstration is on_____ at_____. No preparation before hand, please.

Your CPR instructor will be looking for you in the Department of Education CPR classroom.

Thank you for you time.

Cordially yours,

The Department of Education

ONE-RESCUER CPR

You are walking to your car in a parking ramp. You see a person laying on her back between two parked cars. You do not know what has happened to her. Show me what you would do.

		YES	NO
a)	Determine unresponsiveness	_____	_____
b)	Call for help	_____	_____
c)	Open airway	_____	_____
d)	Check for breathing	_____	_____
e)	Deliver 4 initial breaths	_____	_____
f)	Check for pulse	_____	_____
g)	Activate EMS system	_____	_____
h)	Find correct hand position	_____	_____
i)	Deliver 4 cycles of compression/ ventilation (15:2)	_____	_____
j)	Re-check pulse/breathing	_____	_____
k)	Resume CPR	_____	_____

APPENDIX F

LA CROSSE LUTHERAN HOSPITAL

1910 SOUTH AVENUE / LA CROSSE, WISCONSIN 54601-9980 / (608) 785-0530

December 5, 1985

TO: Richard Miley
Graduate Candidate - Health Education

Laura Wiedman, R.N.
Department of Education - La Crosse Lutheran Hospital

FROM: Rev. Daniel J. Vinge, Chair
La Crosse Lutheran Hospital Human Investigation Committee

RE: USE OF HUMAN SUBJECTS FOR CPR RETENTION STUDY: "AN EVALUATION OF THE EFFECTIVENESS OF TWO TEACHING METHODS ON RETENTION OF BASIC CARDIAC LIFE SUPPORT FOR THE LAY COMMUNITY"

Dear Rick and Laura,

The La Crosse Lutheran Hospital Human Investigation Committee gives you full authority for the use of human subjects for the Department of Education's CPR Retention Study.

It is our understanding the study will begin in April and end in October of 1986 and will involve both a pretest and a three month follow-up post test of a skills sequence involving adult volunteers from the La Crosse, Wisconsin area.

Thank you for the formal written proposal submitted to us concerning the nature, format and timeline for the study.

We wish you the best of luck.

Sincerely,

Daniel J. Vinge

Rev. Daniel J. Vinge, Chair
Human Investigation Committee
La Crosse Lutheran Hospital

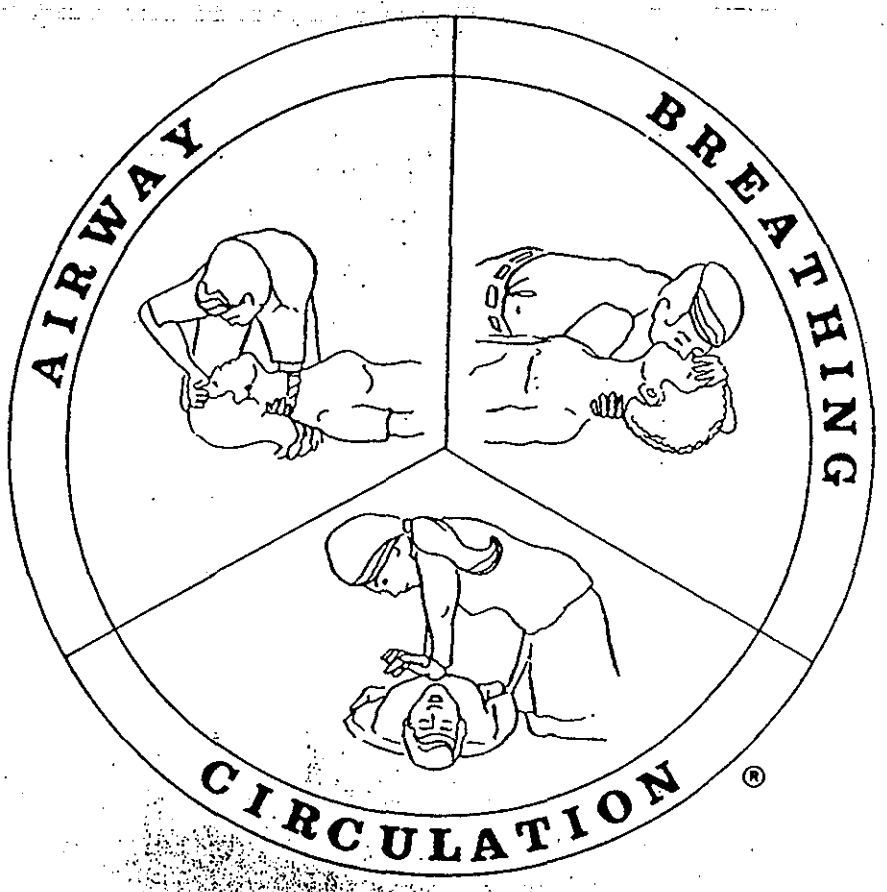
DJV/ds

APPENDIX G

CARDIOPULMONARY RESUSCITATION

CPR

SECOND EDITION



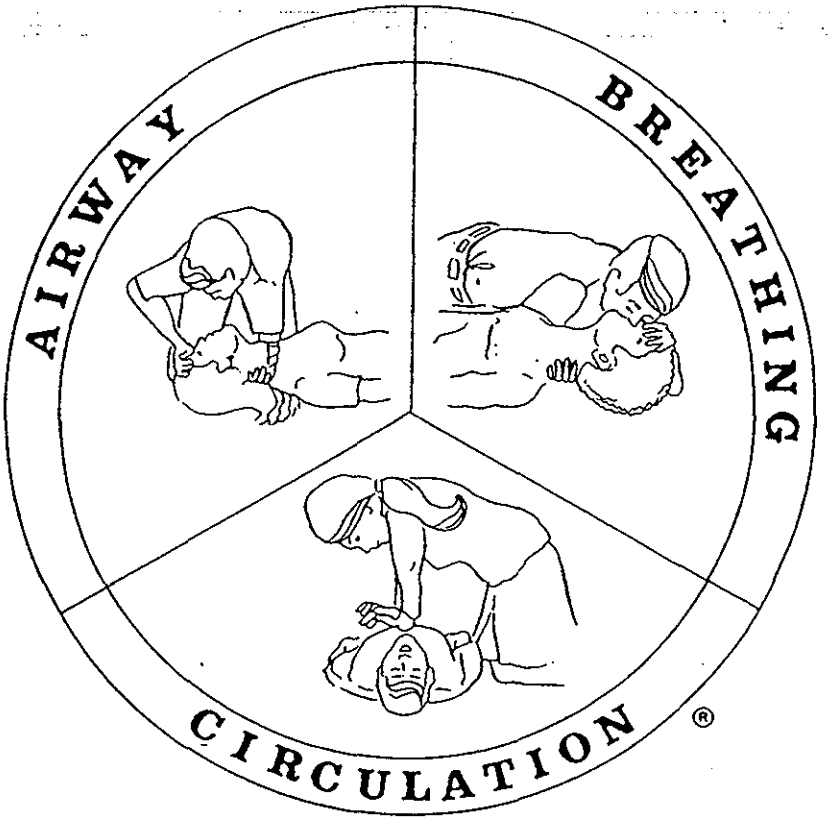
Based on 1980 Standards and Guidelines for Cardiopulmonary Resuscitation (CPR) with Fall 1982 Revisions

Basic Cardiac Life Support
Instructional Material, Study Questions and
American Heart Association, Inc., Performance Sheets

CARDIOPULMONARY RESUSCITATION

CPR

SECOND EDITION



Prepared By
Dorothy M. Effron, Affiliate Faculty
American Heart Association Oklahoma Affiliate

Basic Cardiac Life Support
Instructional Material, Study Questions and
American Heart Association, Inc., Performance Tests

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With deepest appreciation to
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Carl R. Stevenson, M.D. Richard F. Rodgers
American Heart Association, Oklahoma Affiliate, Inc.
Tulsa Chapter, American Heart Association, Inc.
and to the
Affiliate faculty, instructor trainers, instructors and program coordinators across the country with whom it has been a pleasure to share CPR training ideas.

Illustrations: Sammy Newcomb Wolohon

This text is based on the Standards and Guidelines for Cardiopulmonary Resuscitation (CPR) and Emergency Cardiac Care (ECC) published in the Journal of the American Medical Association, Vol. 244, No. 5, August 1, 1980. These standards and guidelines were developed by the National Conference on Cardiopulmonary Resuscitation (CPR) and Emergency Cardiac Care (ECC), September 1979.

In 1973 a National Conference on Cardiopulmonary Resuscitation (CPR) and Emergency Cardiac Care (ECC) recommended broad public training in CPR. Procedures for emergency first aid management of foreign body airway obstruction were further defined by the conference on Emergency Relief of Airway Obstruction in 1975. The 1979 standards conference redefined and expanded some techniques as a result of continuing research and field experience.

Special recognition and appreciation is given to the American Heart Association for providing resource and training materials and for its continuing support of CPR programs at all levels.

Study questions are taken in part from the American Heart Association Basic Cardiac Life Support test material provided by Frank X. Doto, New Jersey Affiliate, AHA.

The American Heart Association Cardiopulmonary Resuscitation and Emergency Cardiac Care performance tests are a part of the standardized certification requirements for Basic Cardiac Life Support.

This concise presentation of CPR concepts is dedicated to every student taking CPR Training.

First Edition 1978: Twelve Printings.
Second Edition: 1980: First Printing, November 1980 Thirty-fifth Printing, October, 1985.

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Proficiency in CPR requires manikin practice supervised by certified instructors. Annual review, including manikin practice, is necessary to maintain CPR skills.

CAUTION: DO NOT PRACTICE CHEST COMPRESSIONS ON ANOTHER PERSON.

CPR BASICS

The ABC's of life support are included in cardiopulmonary resuscitation (CPR); opening and maintaining an AIRWAY (A), providing ventilation through rescue BREATHING (B), and providing artificial CIRCULATION (C) through the use of external chest compression — the ABC's of CPR. This emergency medical procedure includes two broad areas of care — basic life support and advanced life support.

Basic life support training covers recognition of the early warning signs of heart attack and the proper response to these symptoms in a conscious person including prompt entry into the emergency medical system. Needless deaths result from failure to recognize the symptoms, or worse, failure to accept the truth of the symptoms. Some die unnecessarily rather than frighten their family or disturb the doctor in the middle of the night. In addition, you will be able to recognize respiratory arrest or insufficiency, obstructed airway, and cardiac arrest and to perform cardiopulmonary resuscitation, CPR, correctly, if it is necessary.

Advanced life support is basic life support plus the use of specialized equipment to monitor and drugs to stabilize the patient. It may be started by a staff of specially trained emergency medical technicians under the supervision of a physician. Advanced life support also requires the establishment of communications to assure necessary care and to monitor life support until the victim has been transported and admitted to a hospital where physicians assume the responsibility.

IT IS ESTIMATED THAT OVER 650,000 INDIVIDUALS DIE FROM HEART ATTACKS EACH YEAR. ABOUT 350,000 OF THESE DEATHS OCCUR OUTSIDE THE HOSPITAL, USUALLY WITHIN TWO HOURS AFTER THE ONSET OF SYMPTOMS.

Many of these lives can be saved! It has been shown that over 40% of the victims having out of hospital ventricular fibrillation can be successfully resuscitated, if CPR is begun promptly with rapid access to advanced life support. Without bystander CPR, it drops to 21%.

Alert response to other medical emergencies which may lead to respiratory or cardiac arrest can further increase the number of lives saved through basic life support. The victim of a stroke may only need someone to maintain an open air passage, so he can continue breathing. Without rapid diagnosis and treatment of the airway problem, the victim may die before medical help can reach him.

Many other victims who die as a result of such accidental causes as drowning, electrocution, suffocation, drug intoxication, airway obstruction, or automobile accidents could be saved by the prompt and proper application of CPR.

RISK FACTORS

MUCH CAN BE DONE TO CHANGE THE COURSE OF CARDIO-VASCULAR DISEASE AND TO REDUCE THE NUMBER OF UNEXPECTED CARDIAC ARRESTS.

TAKE A LOOK AT YOURSELF;
YOUR LIFE MAY DEPEND ON IT!

Many risk factors for heart disease may be altered to reduce the severity of the problem through prudent heart living — a lifestyle that minimizes the risk of future heart attacks.

HIGH BLOOD PRESSURE — Have your blood pressure checked at least once a year. High blood pressure is a major factor in heart attack and *the* major risk factor in stroke. A wide variety of drugs is available which your physician can prescribe to control high blood pressure.

HIGH LEVEL OF BLOOD FATS (cholesterol and triglycerides) — Eat a well balanced diet low in cholesterol and saturated fats.

SMOKING — A person smoking over a pack a day has nearly twice the risk of heart attack and nearly five times the risk of stroke as a non-smoker. Individual self discipline can control smoking.

OBESITY AND INACTIVITY — Eat properly to lose weight and exercise regularly and sensibly.

DIABETES — With regular medical checkups your doctor can detect diabetes and prescribe programs to keep it in check.

Other risk factors over which you have less control or no control include: stress, heredity, sex, race and age.

EARLY WARNINGS

EARLY WARNINGS OF A HEART ATTACK are symptoms which may indicate that a person may be having or is about to have a heart attack.

PAIN IS ONE OF THE MOST COMMON WARNINGS OF HEART ATTACK. It is frequently confused with indigestion, with uncomfortable pressure and a burning feeling in the lower chest or upper abdomen. Heart attack victims often try antacids without relief. There may be a squeezing in the center of the chest, sometimes severe "like someone standing on my chest". It may even leave and return. It may also be felt in the back or shoulder and may spread or radiate into the arms (most often the left one) or into the jaw or upper abdomen. Pain of this type lasting two minutes or more may indicate that an individual is having a heart attack.

Although many persons suffer agonizing pain when they have a heart attack, some have no pain at all. OTHER SYMPTOMS WHICH MAY OCCUR WITH OR WITHOUT THE CHARACTERISTIC PAIN INCLUDE SWEATING, NAUSEA OR VOMITING, PALPITATIONS (AWARENESS OF A FLUTTERING

OR IRREGULAR HEARTBEAT), AND SHORTNESS OF BREATH. THE VICTIM MAY BE WEAK, PALE OR FEEL FAINT OR DIZZY AND HAVE A SENSE OF IMPENDING DISASTER.

It is extremely important to realize that the victim has a natural tendency to deny that he may be having a heart attack. Delay in getting medical attention resulting from this denial is very important. It may result in the loss of life!

STROKE RECOGNITION — THE PRIMARY SIGN OF STROKE IS A FEELING OF SUDDEN, TEMPORARY WEAKNESS OR NUMBNESS OF THE FACE, ARM AND/OR LEG ON ONE SIDE OF THE BODY. Other warnings include: temporary dimness or loss of sight especially in one eye and unexplained dizziness, loss of balance or falls.

Many fatal strokes could have been prevented if hypertension (high blood pressure), a leading cause of stroke, had been diagnosed and controlled. Many major strokes are preceded by "little strokes" or warning signs. Recognition of these symptoms and prompt medical or surgical attention may prevent a major stroke from occurring. An individual must first be educated to recognize the usual signals of heart attack and stroke. He then must know how to gain entry into the emergency medical system.

HANDLING AN EMERGENCY

EACH INDIVIDUAL SHOULD HAVE A WELL THOUGHT OUT PLAN OF ACTION FOR EMERGENCY USE . . .

. . . The plan should be based on available services in your area. Learn about places where you spend time — at home, work, a cabin, the lake. Is paramedic ambulance service available? Where is the nearest emergency room with advanced life support capability? Discuss the possible choices with your doctor. Remember, time is important in getting the victim into the emergency medical system. You may wish to call your physician; if he is not immediately available, arrange transportation to a facility with life support capability.

When the symptoms are acute, call an ambulance to reduce the elapsed time from beginning of the symptoms to entry into the Emergency Medical Services (EMS) system. Trained emergency medical technicians with advanced life support capabilities can stabilize the victim at the scene of a life-threatening emergency. Stabilization must be maintained while transporting the victim to a hospital with established emergency facilities. Transportation alone, without life support, does not constitute emergency care.

Your emergency plan should include ready access to help through your telephone. If available, 911 is the fastest way to enter the EMS system.

Emergency Medical Services number _____

WHILE YOU ARE WAITING FOR THE AMBULANCE WITH A CONSCIOUS PERSON KEEP HIM QUIET IN WHATEVER POSITION HE PREFERS. DO NOT FORCE HIM TO LIE DOWN; HE MAY ACTUALLY BE BETTER OFF

SITTING UP. TRY TO RELIEVE SOME OF HIS EMOTIONAL STRESS BY QUIETLY REASSURING HIM. Calmly find out how he feels and if he has ever had anything similar. If he is taking medication, try to obtain the bottles and have them readily available for discussion with emergency medical personnel. You may be directed to give a medication such as nitroglycerine. Provide information when help arrives. Make him as comfortable as possible; loosen tight clothing. It is best not to give the victim a drink, especially stimulants and hot or cold liquids. **Keep calm yourself!**

If a victim suffers an arrest, your CPR training can give him a second chance. CPR will train you to recognize whether he has fainted, his breathing has stopped, or his heart has stopped. You will know how to keep an arrest victim alive with mouth-to-mouth ventilation and closed chest compression, if necessary, until medical help arrives.

THE UNCONSCIOUS VICTIM

THE UNCONSCIOUS VICTIM — UNCONSCIOUSNESS IS FAILURE TO RESPOND TO NOISE, TOUCH, FEELING, OR PAIN. IT MAY RESULT FROM:

1. THE VICTIM'S AIRWAY BEING OBSTRUCTED
2. HIS BREATHING ACTUALLY BEING ARRESTED
3. HIS HEART HAVING ARRESTED

THE EMERGENCY AID YOU GIVE WILL DEPEND ON WHICH CONDITIONS ABOVE EXIST. An unconscious victim may have only an obstructed airway; his breathing and heart may not have arrested. This could apply to fainting or to a stroke victim. So long as you keep his airway open, he will continue to breathe. Be alert to the need for medical care.

In many cases, the unconscious victim has stopped breathing, but his heart has not yet stopped. This is called arrested breathing. A child with an obstructed airway, a drug overdose, or an accident victim may initially experience only arrested breathing. However, if breathing is not restored rapidly, the heart will stop in a matter of minutes. You must quickly begin rescue breathing and check the pulse about once a minute to be sure the heart has not stopped.

You also may discover a victim with a cardiac arrest, whose breathing and heart have both stopped. When the heart stops, breathing also stops within seconds. This condition indicates you must immediately restore both breathing and circulation or the individual will die.

CRITICAL TIMING

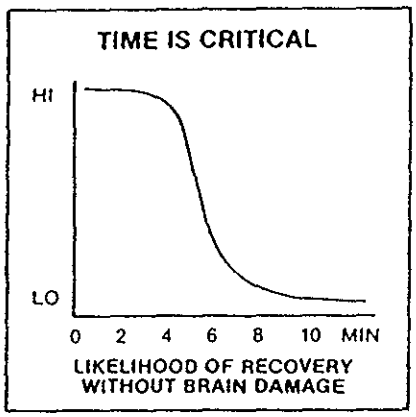
CRITICAL TIMING — If you reach an unconscious victim soon enough, you may save a life by effectively providing the necessary assistance in airway, breathing or circulation.

In cases of arrested breathing or cardiac arrest, immediate action is required. There is usually enough oxygen in the lungs and bloodstream to sustain life for up to six minutes. When breathing stops first, the heart will

continue to pump blood for several minutes, carrying the oxygen remaining in the victim's lungs to the brain, heart and other vital organs. When this oxygen is depleted, the heart itself will stop.

THE FIRST 4-6 MINUTES AFTER A CARDIAC ARREST HOLD THE KEY TO ANOTHER CHANCE FOR LIFE. CPR training provides you with the skill and knowledge necessary to recognize the problem immediately and to perform the needed steps of CPR promptly and effectively. Ideally, basic life support can begin within a few seconds after you become aware of its need. You have the tools — your mouth, your hands and a sincere desire to save a life.

CPR is an emergency procedure to restore life after sudden, unexpected death has occurred. When an arrest occurs, the victim is clinically dead, so at that time possible back or internal injuries are secondary to beginning CPR. Permanent damage from lack of oxygen occurs first in the brain and then more slowly in the other vital organs. The quicker you start basic life support the less chance there is for brain damage.

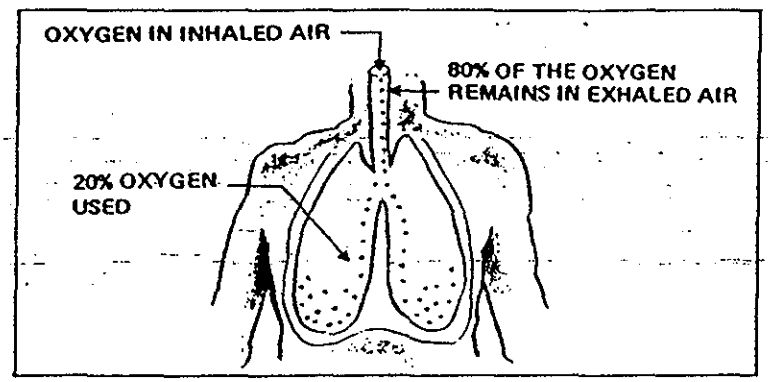


The victim whose heart and breathing have stopped for less than four minutes has excellent chances for full recovery with effective CPR. Between four to six minutes, brain damage may occur. After six minutes brain damage will almost always occur, ultimately resulting in biological death.

CPR is not indicated in certain situations, such as in cases of terminal, irreversible illness where death is expected or where prolonged cardiac arrest dictates the futility of resuscitation efforts. Most of the time, however, you are not certain exactly when breathing failed or the heart stopped. This may occur sometime later than the injury or problem which caused the initial unconsciousness. UNDER CERTAIN CONDITIONS PERMANENT BRAIN DAMAGE MAY NOT OCCUR EVEN AFTER SIX MINUTES. Victims of drowning and cold exposure, especially children and infants, may recover normal brain activity after a longer time. Therefore, give the victim the benefit of the doubt whenever possible and begin CPR.

A simple head tilt opens the airway; you must keep the airway open when giving mouth-to-mouth resuscitation. When you blow into the victim's lungs, the oxygen remaining in your exhaled air provides sufficient oxygen to sustain life. Your body uses only about 20% of the oxygen you inhale. Therefore, 80% of that oxygen is left in the air you exhale, which is more than enough for the victim.

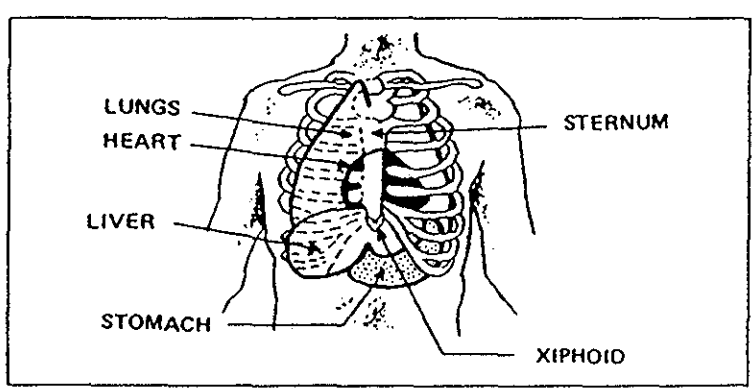
When the heart arrests, external chest compression achieves circulation of oxygenated blood to the vital organs. It is never performed without rescue breathing, but is always a part of CPR for the victim of cardiac arrest.



External chest compression is accomplished by smoothly and rhythmically alternating pressure and release of pressure over the lower half of the breastbone, or sternum. The heart lies tipped slightly to the left of the middle of the chest below the lower half of the sternum. The illustration shows the position of other vital organs under the rib cage, the lungs, liver and stomach. As you perform external chest compression, you must apply enough force to produce circulation without causing injury to these other organs. Also, the ribs are quite fragile and crack easily.

When you apply pressure over the lower half of the sternum and then release that pressure, you cause a change in the internal pressure in the chest. These alternating pressure changes cause blood to circulate from the lungs and heart, to the body, and back for a new supply of oxygen. Thus external chest compression maintains an artificial circulation of blood for a victim who has suffered cardiac arrest. The carotid artery blood flow resulting from external chest compression usually is only one-fourth to one-third of normal.

The lower tip at the end of the sternum is called the xiphoid. It is a projection which extends below the main bone of the breastbone and lies directly over the liver. Excess pressure in the xiphoid area could injure the liver.



LEGAL CONSIDERATIONS

Legal Considerations — You may wonder if you will be held liable for attempting to provide emergency assistance. In most states "Good Samaritan" laws provide protection from liability to persons who, in good faith, attempt to render CPR to an unconscious victim with a cardiac arrest.

IF YOU DO BEGIN CPR, YOU MUST ALSO REALIZE YOUR OBLIGATIONS. THE DECISION TO ABANDON CPR EFFORTS CAN ONLY BE MADE BY A PHYSICIAN. Once you begin CPR, therefore, you are obligated to continue until:

1. The victim recovers spontaneous ventilation and circulation
2. You transfer the resuscitation effort to another responsible person who continues CPR
3. A physician assumes responsibility
4. You transfer the victim to properly trained personnel charged with EMS responsibility
5. You are totally exhausted and unable to continue

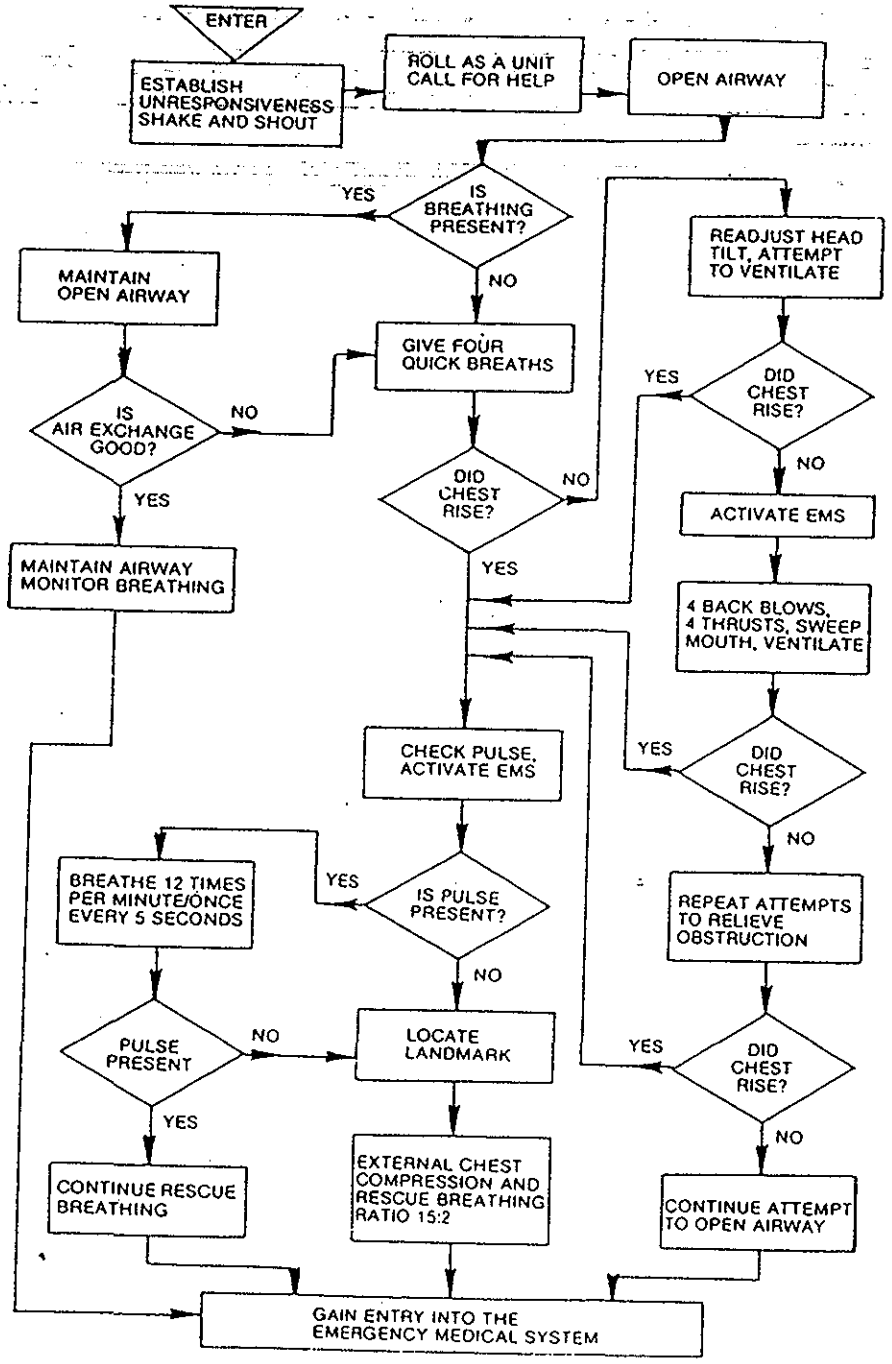
CPR ACTION DIAGRAM

CPR ACTION DIAGRAM (page 11) — The Action Diagram outlines step by step what you must do. It specifies the critical decisions you must make and, on the basis of your findings, guides you to the next step. THE ACTION DIAGRAM SUMMARIZES IN SIMPLE VISUAL FORM THE STEPS INVOLVED IN BASIC CARDIAC LIFE SUPPORT. THE STEPS ARE INDICATED BY DIRECTIONAL ARROWS, AND THE POINTS REQUIRING A DECISION ARE INDICATED BY DIAMONDS. After opening the airway you have a decision; is the victim breathing or not? If the answer is yes, he is breathing, you would follow the arrow to "Maintain Open Airway". But, if the answer is no, he is not breathing, you would follow the arrow to "Give 4 Quick Breaths". You must now decide if you were successful in getting air into the lungs; did you get a "Chest rise"?

In an emergency situation you must realistically be concerned with the possible danger to yourself. In the case of an automobile accident, is fire a danger? If an individual has been electrocuted, is he still in contact with the source of electricity? If a person is drowning, are you trained to rescue the person without drowning yourself? You must protect your own life if you are going to help the victim.

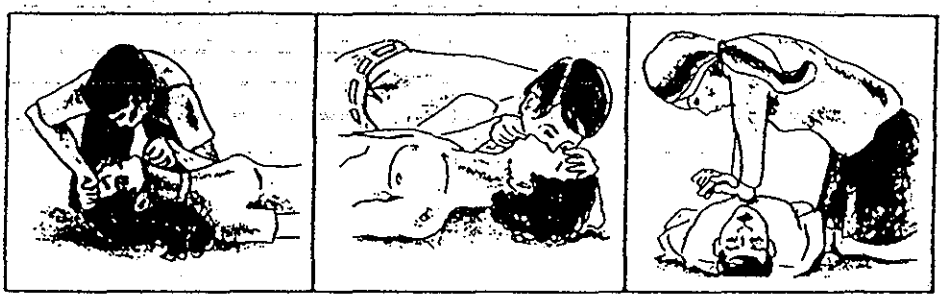
Accident victims may also present special problems which affect CPR. How do you perform CPR on a victim who may have a broken neck or back? Do you have to remove water from the lungs of a drowning victim? First you will learn how to do all the basic procedures which you need to perform CPR for a victim of heart attack or other medical emergency, then later consider some special situations.

ACTION DIAGRAM — UNCONSCIOUS ADULT VICTIM
SINGLE RESCUER — CARDIOPULMONARY RESUSCITATION, CPR



ABC's OF CPR

Cardiopulmonary resuscitation involves three basic rescue skills, the ABC's of CPR . . .



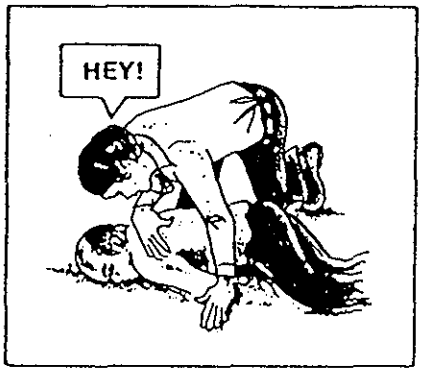
AIRWAY "A" BREATHING "B" CIRCULATION "C"

These skills are interdependent and must be performed in ABC order. If the air passages are blocked, air cannot move in and out of the lungs. You must open the Airway before you can find out if the victim is Breathing or before you can breathe for him. A must precede B. If the victim is breathless, you must begin rescue Breathing before taking time to check the pulse to assess Circulation. This assures that there is oxygen in the blood for the heart to function if it is able. Breathing is necessary to support circulation. If there is no pulse, you must continue rescue breathing while providing artificial circulation.

HANDLING THE UNCONSCIOUS VICTIM

THE UNCONSCIOUS VICTIM — When a person loses consciousness, regardless of whether or not he has had a cardiac arrest, his body relaxes fully and usually ends up in a crumpled position, face down. How can you tell if the victim is unconscious? The Action Diagram indicates, "Establish Unresponsiveness, Shake and Shout".

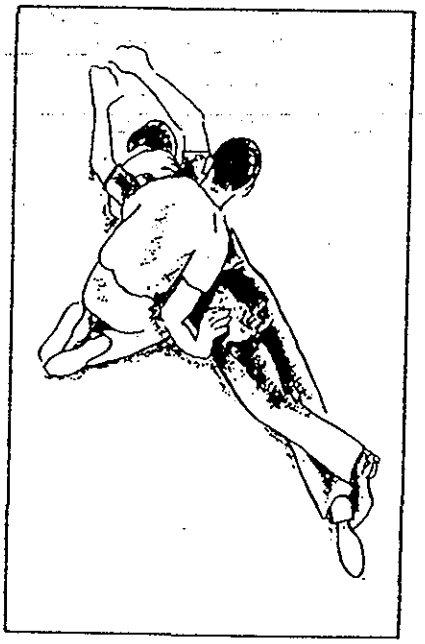
If there is no immediate evidence which could cause you to suspect a neck injury, the easiest and quickest way to establish unresponsiveness is to gently shake the person's shoulder and shout loudly near his ear to arouse him. (If circumstances lead you to expect neck injury, you would slap the face and shout rather than risking further injury by shaking.) IF THE VICTIM IS UNRESPONSIVE, HE IS UNCONSCIOUS, AND HE MAY BE IN IMMEDIATE NEED OF CPR.



IF THE VICTIM IS NOT RESPONSIVE TO YOUR ATTEMPTS TO AROUSE HIM, CALL FOR HELP. Even if no one is in sight, call in the hope

that someone will be in hearing distance who can assist you or go to call an ambulance. Remember the critical 4 to 6 minutes!

IF THE VICTIM IS FOUND CRUMPLED AND LYING FACE DOWN, HE MUST BE ROLLED OVER ON HIS BACK TO BEGIN CPR. ROLL THE VICTIM AS A UNIT SO THAT THE HEAD, SHOULDERS AND TORSO MOVE SIMULTANEOUSLY WITHOUT TWISTING.



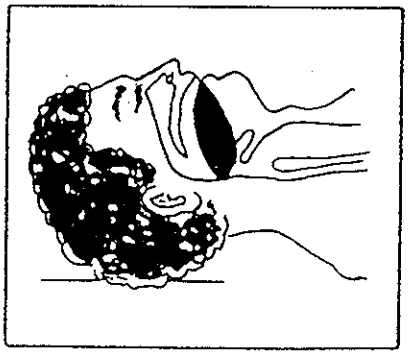
First, straighten the victim's legs. You are going to kneel beside the victim to position his body with your hands and firmly support the neck and back as your roll him away from you. Position yourself beside the victim, cross the nearer leg over the other leg. Gently straighten both of the victim's arms above his head. The arm on the far side will provide a pillow for the head as you roll the victim.

Slide your hand under the nearer arm close to the shoulder and place the palm of your hand over the back of the victim's head near the neck. Be sure your hand is in a position to support the weight of the head as you roll the victim.

Place your other hand on the victim's hip. Roll the victim away from you, being careful to prevent twisting. FOLLOW THE VICTIM ON YOUR KNEES to maintain your balance and to assure support until the roll is completed. KEEP YOUR HANDS IN THEIR ORIGINAL POSITIONS, BEING CAREFUL NOT TO BEND THE NECK FORWARD, UNTIL THE VICTIM IS FLAT ON THE FLOOR.

AIRWAY — OPENING THE AIRWAY

OPENING THE AIRWAY, "A", IS THE FIRST BASIC SKILL IN CPR. The steps can be performed quickly by one person in almost any situation.

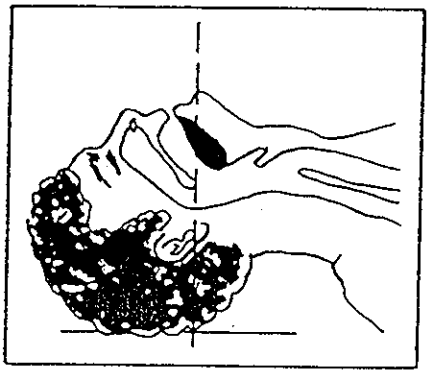


THE TONGUE FREQUENTLY CAUSES THE AIRWAY TO BECOME OBSTRUCTED IN AN UNCONSCIOUS PERSON. As a person loses consciousness, his muscles relax. This relaxation may allow his lower jaw to drop down and his tongue may fall into the back of his throat; as shown in the illustration, the tongue then blocks the airway.

HEAD TILT

THE HEAD TILT ASSOCIATED WITH THE NECK LIFT OR THE CHIN LIFT IS THE PRIMARY METHOD FOR OPENING THE AIRWAY. The first step is the head tilt. Since the tongue is attached to the lower jaw, forward movement of the jaw with the head tilt will lift the tongue away from the back of the throat. When the airway is opened, sometimes the victim will start breathing with good air exchange.

You have already positioned the victim on his back and are now ready to open the airway. Kneel near the victim's head; one knee should be beside the victim's shoulder and the other knee in line with the top of the victim's head. From this position you can easily attain the leverage needed to gently tilt the head and to maintain the tilt while you check breathing and rescue breathe if necessary.

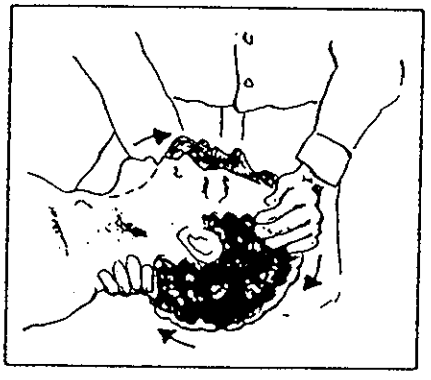


Place the palm of your hand nearest the victim's head on his forehead. Keep your thumb and fingers together and pointed away from you. Press firmly back on the forehead; this will cause the head to tilt or rotate back and will move the tongue away from the back of the throat.

It is important to tilt the head back far enough to open the airway. When the neck is properly hyperextended in the open airway position, the chin position changes. You will note the tip of the chin is pointing up in the air and is on a line with the ear lobes.

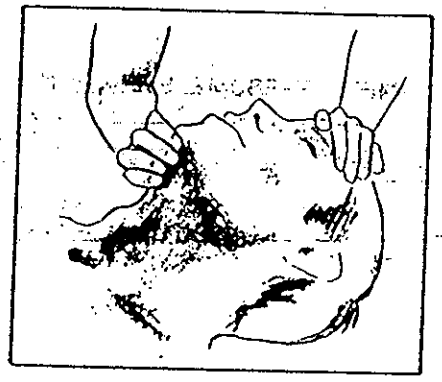
HEAD TILT — NECK LIFT

IT WILL BE EASIER TO OBTAIN A GOOD HEAD TILT IF YOU USE YOUR OTHER HAND TO GENTLY LIFT UP ON THE NECK. Place your other hand under the victim's neck close to the back of the head. Lift up gently on the neck, allowing the head to rotate back as you press down with the hand on the forehead. The head tilt with proper neck lift support provides an open airway with the least neck vertebrae hyperextension. Don't reach across the throat to lift the neck from the opposite side. Excessive force can cause neck injury so act with reason.



HEAD TILT — CHIN LIFT

The chin lift is another method of supporting the head tilt. It may open the airway, if the head tilt-neck lift was not effective. In the unconscious breathing victim an open airway may be efficiently maintained by this technique.



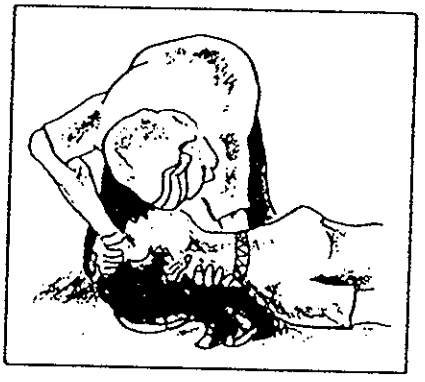
When doing a chin lift, one hand presses back on the victim's forehead to maintain the head tilt. Hook the fingers of the other hand under the bony part of the lower jaw on the side nearer you. Your index finger will be near the chin and your next two fingers right behind it along the side of the jaw bone. Lift up and forward on the chin until the teeth are nearly closed. You are lifting to support the backward rotation of the head with the head tilt. You are not simply closing the mouth. Be careful to lift on the jaw bone, not under the chin, as you could obstruct the airway.

The lips must remain open to allow free air passage. If necessary, the thumb may be used to open the lower lip; it is not used to lift.

It is best to leave dentures in place. The chin lift may help you keep them in position. If they will not stay in place, then of course, remove them.

BREATHING — ASSESSING BREATHING

YOU MUST NOW MAKE YOUR FIRST DECISION: IS THE VICTIM BREATHLESS? Once you have opened the airway, the victim may begin to breathe again by himself. If you find the victim is not breathing adequately or is not breathing at all, you must be prepared to begin rescue breathing. Keep the airway open by maintaining the head tilt with your hands while you check breathing.



To assess breathing, lean over the victim's head facing toward the chest; place your ear within an inch of the victim's mouth and nose.

You will use three different senses to check for signs of breathing. Feel for air movement at *mouth* and *nose*, listen for air movement at *mouth* and *nose* and watch for *chest* and/or *belly* movement.

Seeing the chest or belly rise is not necessarily a reliable indication of breathing. A victim may move his chest or belly in an attempt to breathe but not actually be breathing because of an obstruction. The critical indications of breathing are feeling and hearing breathing at the mouth and nose. If a person is moving air into and out of his lungs, it will pass through the mouth and/or nose.

RESCUE BREATHING — MOUTH-TO-MOUTH METHOD

IF THE INDIVIDUAL DOES NOT PROMPTLY RESUME BREATHING AFTER YOU HAVE OPENED THE AIRWAY, OR IF THE VICTIM IS JUST BARELY BREATHING OR IS STRUGGLING TO BREATHE WITH POOR AIR EXCHANGE, YOU MUST BEGIN RESCUE BREATHING IMMEDIATELY.

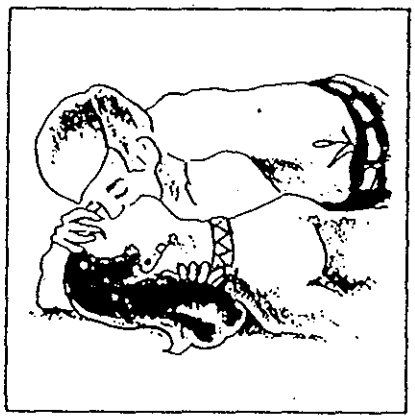
RESCUE BREATHING, "B", IS THE SECOND BASIC SKILL IN THE ABC'S OF CPR. MOUTH-TO-MOUTH BREATHING AND MOUTH-TO-NOSE BREATHING ARE BOTH TYPES OF ARTIFICIAL VENTILATION.

You should be positioned by the victim's head and shoulders as you were when you opened the airway with your hands in position to maintain the head tilt. YOU MUST KEEP AN OPEN AIRWAY AS YOUR EFFORTS TO BREATHE FOR THE VICTIM WOULD BE USELESS IF THE TONGUE WERE BLOCKING THE AIRWAY. In addition, an improperly opened airway or excessive breaths can allow air to pass into the stomach causing gastric distension. As you are leaning over the victim, if you notice gum, dirt, vomitus or other foreign matter, remove it quickly from the victim's mouth and begin breathing without delay.

YOU WILL BEGIN RESCUE BREATHING WITH FOUR BREATHS TO QUICKLY REBUILD THE OXYGEN SUPPLY IN THE LUNGS. When a person has had a respiratory arrest, the small air sacs in the lungs collapse. To refill these most effectively, the first four breaths are given without allowing the lungs to empty completely between breaths.

YOU MUST MAKE AN AIRTIGHT SEAL AT BOTH THE VICTIM'S NOSE AND MOUTH FOR MOUTH-TO-MOUTH BREATHING. Pinch the nose to seal the nostrils so air does not escape. To achieve the nose pinch, simply turn the hand resting on the victim's forehead so that you can pinch the nostrils closed between your thumb and forefinger. In this way you can continue exerting pressure on the forehead with the heel of your hand.

To seal the mouth, you must open your mouth very wide, as if you were going to take the first bite out of a big apple, and fully cover the victim's open mouth with yours. Take a big breath and seal your lips around the victim's mouth to prevent air from leaking out and blow forcefully into the victim's lungs.



YOU MUST NOW MAKE YOUR SECOND DECISION — DID YOU GET AIR INTO THE LUNGS AS INDICATED BY A NORMAL CHEST RISE?

When you blow forcefully into the victim's mouth you will feel some resistance from his lungs, but it should easily yield to your breath. The best indicator of effective ventilation is seeing the chest rise when you

blow just like it would if the victim were breathing normally. Also, as you remove your mouth, tipping your head slightly to get a new breath of fresh air, you should feel air flowing out of the mouth and see the chest begin to fall.

IF YOU OBSERVED A GOOD CHEST RISE WITH THE 4 BREATHS, YOU ARE NOW READY TO CHECK THE PULSE.

AIRWAY OBSTRUCTION — UNCONSCIOUS VICTIM

However, if you found the resistance of the lungs did not yield to your breath, and IF YOU DID NOT SEE THE CHEST RISE, THE VICTIM HAS SOME TYPE OF AIRWAY OBSTRUCTION. Remember the ABC order of CPR — Airway, Breathing, and Circulation. You must successfully ventilate the victim to restore oxygen to his lungs before you proceed to the pulse check.

You will recall that the tongue is the most common airway obstruction in an unconscious person. INADEQUATE HEAD TILT MAY NOT HAVE OPENED THE AIRWAY THE FIRST TIME. YOU SHOULD REPOSITION THE HEAD TO ASSURE THAT YOU HAVE PROPERLY OPENED THE AIRWAY AND ATTEMPT TO VENTILATE AGAIN. Did you get a chest rise? If you have now successfully completed four breaths, you are ready to check pulse.

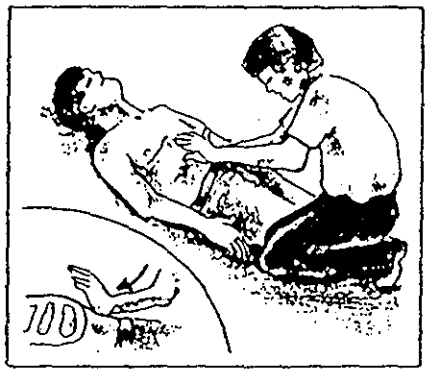
IF YOU REPOSITIONED THE HEAD BUT ARE STILL UNABLE TO GET AIR INTO THE LUNGS, YOU MAY ASSUME THE OBSTRUCTION IS CAUSED BY A FOREIGN BODY. YOU WILL USE A COMBINATION OF BACK BLOWS AND MANUAL THRUSTS TO TRY TO CLEAR THE OBSTRUCTION. You must give 4 good breaths before you go on to the pulse check. If help is available, send someone to call an ambulance.

Kneel beside the victim's chest. You need to roll the victim onto his side facing you. This will be easier to do if you put the arm nearer you up along the head. Roll the victim toward you with your hands on his shoulder and hip until his chest is supported against your legs. Give a sharp blow between the shoulder blades over the backbone with the heel of your hand. This may be repeated 4 times in rapid succession, if needed. Maintain body support as you quickly roll the victim onto his back again.

NEXT DELIVER CHEST OR ABDOMINAL THRUSTS USING THE AIR IN THE LUNGS TO FORCE THE OBJECT OUT OF THE AIRWAY. The advantages of each method are discussed under "Enrichment" (page 34).

Like the back blows, each thrust has the potential of relieving the obstruction. If needed, a series of 4 may be performed in rapid succession.

TO DELIVER ABDOMINAL THRUSTS kneel beside the victim's hips or straddle his thighs. Choose the position which is the most reasonable for your size in relation to the victim. With one hand over the other, place the heel of your hand on the abdomen between the navel and the ribs. Lean your shoulders over the victim's abdomen and press into the abdomen and upward toward the head. The force of the thrust should be along

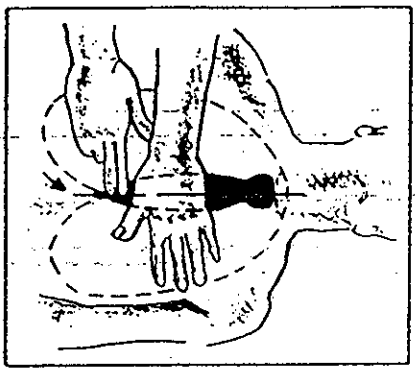


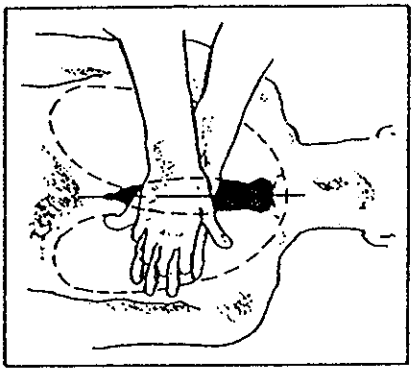
the midline of the body not off to either side. Your hand should not press on the lower ribs or sternum.

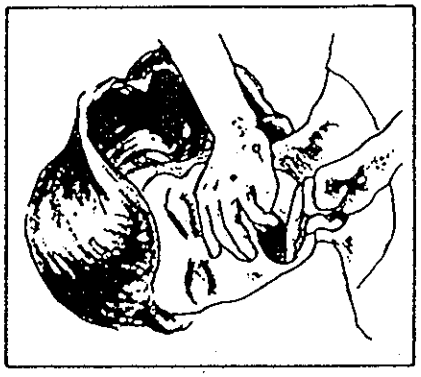
IF YOU ARE GOING TO USE CHEST THRUSTS, kneel beside the victim's chest. You must locate the proper position to apply pressure over the lower half of the sternum.

Run your fingers up the rib cage until your middle finger fits right into the notch where the ribs and sternum meet, and your index finger is beside it across the lower end of the sternum.

Then place the heel of your other hand on the victim's chest, centering it over the midline of the sternum, right beside the index finger. Place the heel of the second hand directly over the heel of the first hand, parallel to one another. TIP YOUR FINGERS UP OFF THE CHEST. This will give maximum control and concentration of effort in the correct position and the least risk of cracked ribs. Give up to 4 quick downward thrusts. *DO NOT THRUST WITH FORCE IN PRACTICE.*







CHECK FOR A FOREIGN OBJECT in the mouth or throat. With the head up, you grasp the lower jaw and tongue with the thumb and fingers and lift to open the mouth. Holding the victim's tongue down against the lower jaw with your thumb may offer better access to sweep an object from the throat.

If you are not able to quickly open the mouth this way, cross your thumb and index finger and slip them between the victim's lips in the corner of the mouth. Brace against the upper teeth and push against the lower teeth to separate the jaws. This crossed-finger technique allows you to apply considerable pressure to open the unconscious victim's mouth.

CLEAR THE MOUTH — Once the mouth is opened, sweep it for debris. Run your index finger down inside of the cheek towards the base of the tongue. Scrape across the back of the throat, and clear the debris out the other side of the mouth with a sweeping motion of the fingers. It may be necessary to remove dentures.

Open the airway and attempt to ventilate. If you are able to give four breaths and see the chest rise, you are ready to check the pulse.

If the victim is still obstructed, REPEAT THE ABOVE MANEUVERS IN RAPID SEQUENCE. AS THE VICTIM LOSES CONSCIOUSNESS, HIS MUSCLES RELAX AND YOUR EFFORTS MAY BE EFFECTIVE IN DISLODGING THE OBSTRUCTION.

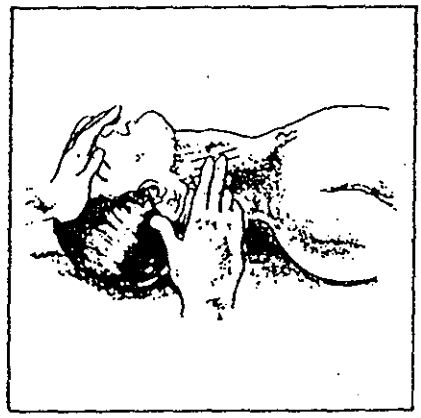
Each time you attempt to ventilate, you must decide if your breaths caused a chest rise. When your answer is "Yes", you are ready for the pulse check.

***CIRCULATION* — ASSESSING PULSELESSNESS**

At this point you have opened the airway and given 4 good quick breaths. Now, you must determine quickly if his heart has stopped as well as his breathing. If so, blood is not circulating to carry the oxygen from the victim's lungs to the brain, heart and other vital organs.

TO CHECK FOR CARDIAC ARREST, YOU MUST FIND THE CAROTID PULSE IN THE NECK. THE PULSE AREA MUST BE FELT GENTLY, NOT COMPRESSED. The carotid pulse is selected over other pulses because of its location. Since you are at the victim's head, the neck is convenient and is easily accessible without clothing removal. The carotid pulse may be felt when others are too weak to detect.

Maintain the airway by continuing the downward pressure of your hand on the forehead. You may release the nose pinch, but leave your hand in place. Take your other hand out from under the neck to feel for the pulse. With your fingertips, feel the Adam's apple, about half-way between the chin and collarbone. Draw your fingers back toward you into the groove beside the Adam's apple. Do not reach across the throat. Press *lightly* to feel the pulse with the most sensitive part of your fingertips or pulps.



IT IS TIME FOR YOUR THIRD DECISION — IS THE VICTIM PULSELESS? DO NOT RUSH! FEEL VERY CAREFULLY TO FIND A PULSE. TAKE AT LEAST 5 SECONDS AND UP TO 10 SECONDS IF NECESSARY. YOU SHOULD NEVER BEGIN CHEST COMPRESSION ON SOMEONE WHOSE HEART IS STILL BEATING — EVEN IF THE PULSE IS WEAK.

If someone has answered your call for help, send him to activate the emergency medical system as soon as you assess the victim. Prompt initiation of basic and advanced life support improves the victim's chances for survival. If help is not available, continue your rescue as indicated by the pulse check.

The person calling the ambulance should report the location and condition of the victim, street address, location at that address if it is a large public area or access to the area if it is difficult to reach. He should also report if the victim is in respiratory arrest with airway complications or in cardiac arrest, and any other pertinent information. The caller should hang up last.

PULSE PRESENT — RESCUE BREATHE

IF THERE IS A PULSE, THEN ONLY BREATHING HAS ARRESTED. Continue rescue breathing at a rate of once every 5 seconds, or 12 times per minute. When you rescue breathe, you will lift your mouth away after each inflation, turn your head, and watch the victim's chest fall as you allow time for the lungs to empty after each breath. Adequate ventilation is ensured on every breath if the rescuer:

1. Sees the chest rise and fall
2. Feels the give of the victim's lungs as they expand when he breathes
3. Hears and feels the air escape during exhalation

Check the pulse once a minute to be sure the heart is still beating. CONTINUE BREATHING AS LONG AS THE BREATHING INADEQUACY PERSISTS.

If the unconscious victim begins to breathe on his own while you are doing rescue breathing, you must still maintain an open airway. If he resumes consciousness, you may wish to turn him on his side and continue to monitor breathing.

If vomiting should occur, roll the victim onto his side so stomach contents will drain from the mouth. Wipe the mouth out quickly and continue.

Any victim who has required rescue breathing must have medical evaluation, as his life may still be in danger.

GASTRIC DISTENSION

Gastric distension, filling of the stomach with air, is a possible complication of rescue breathing. If the victim has an open airway, air will move more easily into the lungs than into the stomach. If the airway is not completely open, the pressure of the rescuer's breath in the narrow passageway may cause the air to enter the stomach as well as the lungs. Even with a properly opened airway an excessively large breath will overwhelm the volume of the lungs and pass into the stomach.

Gastric distension is most common in children but can also occur in adults. It may be dangerous if it becomes severe, because then it exerts upward pressure on the diaphragm, reducing the capacity of the lungs and increasing the danger of regurgitation of stomach contents with possible aspiration into the airway and lungs.

IF GASTRIC DISTENSION OCCURS DURING CPR, REPOSITION THE AIRWAY TO BE SURE IT IS OPEN. Avoid excessive pressure when you breathe by watching the chest and using only enough breath to get a good chest rise. Continue rescue breathing.

PULSE ABSENT — EXTERNAL CHEST COMPRESSIONS

CARDIAC ARREST — When sudden, unexpected cardiac arrest occurs, all of the ABC's of basic cardiac life support are required in rapid succession.

IF YOUR THIRD DECISION INDICATES THAT THE VICTIM IS PULSELESS, YOU WILL NOW INCLUDE ARTIFICIAL CIRCULATION (EXTERNAL CHEST COMPRESSION), "C", THE THIRD BASIC SKILL OF CPR.

You know when the 4 quick breaths produce a chest rise you must check to see if the victim's heart has arrested. Even if you feel a pulse when you first check, you continue to check about once every minute during rescue breathing to make sure the heart keeps circulating blood after breathing has arrested. If you feel any pulse at all, even weak or sporadic, do not begin external chest compression. Performing compression on a person whose heart is functioning can be extremely dangerous. Therefore, AS YOU LEARN HOW TO DO EXTERNAL CHEST COMPRESSION, PRACTICE ONLY ON A MANIKIN: DO NOT, UNDER ANY CIRCUMSTANCES, PRACTICE YOUR SKILLS ON A LIVING CREATURE.

IT IS ESSENTIAL THAT YOU LOCATE THE CORRECT AREA OF THE STERNUM (BREASTBONE) AND APPLY PRESSURE RHYTHMICALLY TO PRODUCE EFFECTIVE ARTIFICIAL CIRCULATION, AND TO PREVENT INJURY TO THE RIBS OR THE ORGANS UNDER THEM.

HAND POSITION

THE CORRECT LOCATION, OR LANDMARK, FOR APPLYING PRESSURE IS THE LOWER HALF OF THE STERNUM. Pressure is never applied over the xiphoid, as you may damage the liver and cause severe internal bleeding. When external chest compression is performed, the victim should be in a horizontal position on a *firm surface* with *no* pillow under the head. If extra people are available to help, circulation may be improved by slightly elevating the legs.

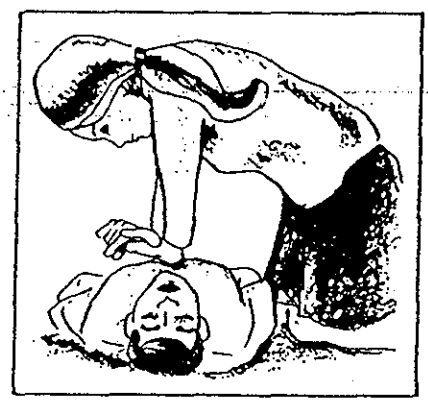
Kneel beside the victim (who would be lying flat on his back where you positioned him when you opened the airway). The proper hand position for chest compressions is located in exactly the same way as you found hand placement for chest thrusts (see details and illustrations, page 18.).

REMEMBER, WHEN YOU LOCATE THE NOTCH WHERE THE RIBS MEET AND PLACE YOUR HAND ON THE CHEST, THE ONLY CONTACT IS BETWEEN THE HEEL OF YOUR HAND AND THE FLAT LOWER HALF OF THE VICTIM'S STERNUM. Proper hand placement decreases the possibility of rib fracture and increases compression effectiveness. Care must be taken to center the heel of your hand on the midline of the sternum and not let it slip off on the ribs on either side. Also, your fingers must not press on the ribs during compression. The heel of the second hand should be directly over the heel of the first hand. Interlacing your fingers may help you keep your fingers tipped up off the chest.

BODY POSITION

The position of the rest of your body is equally important for maximum effectiveness with minimal effort. EXTERNAL CHEST COMPRESSION REQUIRES CONSIDERABLE EXERTION: YOU MUST DO IT AS EFFICIENTLY AS POSSIBLE TO MAINTAIN YOUR ENERGY AND STRENGTH TO KEEP THE CARDIAC ARREST VICTIM ALIVE.

WHILE KEEPING YOUR HANDS IN PLACE ON THE CHEST, STRAIGHTEN OUT YOUR ARMS, POSITIONING YOUR SHOULDERS DIRECTLY OVER THE VICTIM'S STERNUM. THIS WILL DIRECT THE PRESSURE STRAIGHT DOWN ON THE STERNUM, NOT OFF AT AN ANGLE. YOU WILL ALSO ACHIEVE THE MOST PRESSURE WITH THE LEAST EFFORT. One knee should be about at the victim's shoulders and the other knee down toward the waist. Keep your arms straight and use your body weight to exert downward pressure. Bending your elbows or pushing with your arms or shoulders requires greater effort and is more tiring.



To compress the victim's sternum you must push with enough force to depress the sternum 1½" to 2". You must then completely release the pressure to allow the heart and lungs to refill. Lean forward, shoulders directly over your outstretched hands, until you feel as if you would fall forward if your hands and arms were not supporting you. Let your body's natural weight falling forward provide the force to depress the victim's sternum. Bending at your hips allows your shoulders and arms to move straight up and down as a unit. You should not rock back and forth on your knees.

DO NOT PUSH WITH ALL YOUR STRENGTH . . . BUT PUSH WITH ONLY ENOUGH FORCE TO DEPRESS THE ADULT STERNUM 1½ TO 2 INCHES. This will produce sufficient pressure in the chest to circulate oxygen-rich blood to maintain life.

Then, you must fully release this pressure, permitting the chest to return to its normal position. This allows blood to flow into the chest where it is oxygenated and is then available to be pumped out on the next compression. When pressure is released, the heel of the hand should stay in contact with the chest to maintain the proper compression position on the sternum.

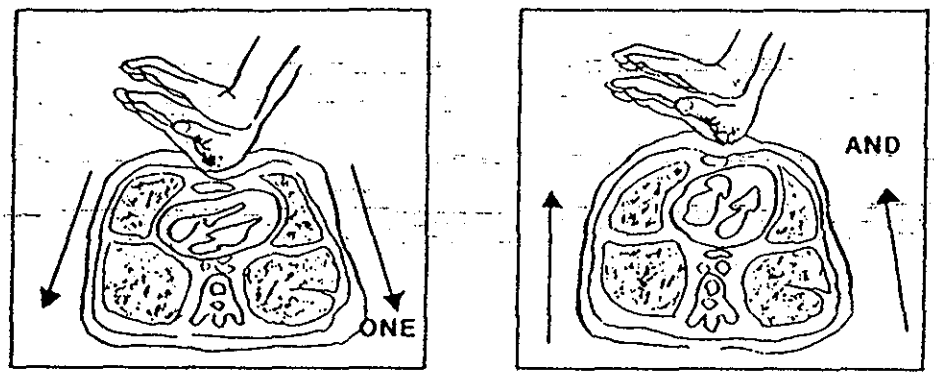
RHYTHM

The time required for compression (the downstroke) should equal the time allowed for release (the upstroke).

Recent studies emphasize the importance of proper compression duration. A slight pause at peak compression assures at least 1/2 compression time and not over 1/2 release time. This technique increases blood flow.

Counting aloud, "ONE AND TWO AND THREE" WILL HELP MAINTAIN BOTH SPEED AND RHYTHM. Compressing on "one", releasing on "and", compressing on "two", releasing on "and", will help keep the downward pressure time and the release time the same. To release the pressure on the sternum, just bend up from your hips, shifting the weight of your body.

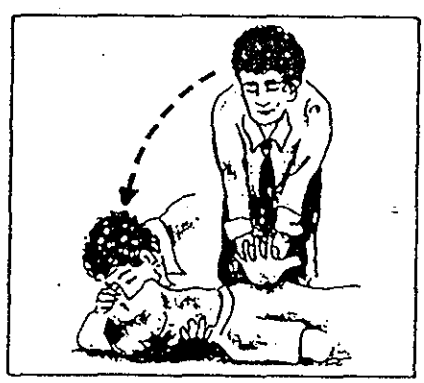
COMPRESSION (DOWNSTROKE) = RELEASE (UPSTROKE)



Keep the heel of the hand in contact with the sternum. Don't bounce against the chest or change hand position in any way.

For compression to be effective, the victim must be lying on a firm surface. A soft surface will give way each time you press on the chest making compressions less efficient. If the victim is in bed, a board must be inserted under the body, or the victim must be placed on the floor.

Properly performed chest compression is only about one quarter to one third as effective as the normal blood flow. Irregular, jabbing compressions should be avoided. They increase the possibility of injury and may not produce adequate flow.



The chest should be compressed 15 times while counting 1 and 2 and 3 . . . 15. A smoother rhythm may be maintained by counting 1 and 2 . . . 10, then 1 . . . 5 avoiding the two-syllable teens.

Keeping your knees in place, lean over from the waist to perform rescue breathing again. Open the airway, pinch the nose, give two quick, full breaths, and watch for the chest rise.

When you lean over to breathe twice, you lose your hand position for compressions. Since the proper location for compression is critical, both for safety and effectiveness, you must quickly locate the landmark area for compression on the lower half of the sternum every time you resume compressions.

RATIO & RATE

YOU WILL DO CYCLES OF 15 COMPRESSIONS AND 2 BREATHS WHEN YOU PERFORM CPR AS A SINGLE RESCUER ON AN ADULT VICTIM. After the first four, quick breaths, if the pulse check indicates cardiac arrest, you must alternately perform 15, 1½" to 2" deep, smooth compressions and 2 quick, full breaths. For optimum effectiveness, 4 cycles of the 15:2 ratio

should be completed in approximately one minute. This means you will do 60 compressions and 8 breaths in 60 seconds. You will have to compress faster than once a second to allow time to give the 2 quick breaths. In an average cycle the 15 compressions would take 10 or 11 seconds and the 2 breaths 4 or 5 seconds. The rate of compressions for a one person rescue is 80, but 60 compressions result in a minute because of the breathing time. Remember, one compression includes both the downward pressure and the release. Compressions must be done in a smooth, regular rhythm and be uninterrupted. Release of pressure must immediately follow compression and be of equal duration. The airway must be opened before you ventilate. The two full lung inflations are quick breaths like the first four and must produce a chest rise.

Artificial circulation is less effective than normal circulation. Any interruption in compression results in a drop in blood flow and blood pressure to zero. Adequate ventilation must accompany correctly performed chest compressions. Manikin practice will help you combine proper technique with correct timing.

CHECKING EFFECTIVENESS

IN ADDITION TO THE INITIAL PULSE CHECK, YOU MUST CONTINUE TO CHECK TO DETERMINE IF YOUR RESCUE ACTION IS SUFFICIENT OR IF THE VICTIM RESUMES SPONTANEOUS BREATHING AND CIRCULATION.

PAUSE AFTER *ONE MINUTE*, AND *EVERY FEW MINUTES* THEREAFTER, TO CHECK CAROTID PULSE AND BREATHING. NEVER PAUSE FOR MORE THAN *FIVE SECONDS* AT A TIME TO CHECK THESE LIFE SIGNS. Remember, blood flow and blood pressure drop to zero when you stop! If the victim is still pulseless, immediately deliver 2 breaths and resume cycles of 15 compressions and 2 breaths.

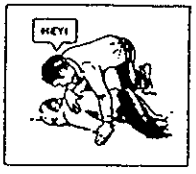
If another person arrives on the scene who is not trained to do CPR, send him for help, then have him check the pulse for you. A second person monitoring the pulse should feel a pulse each time you compress.

It is an indication that CPR is being performed correctly if the victim's color improves or if normal color is retained. This is especially noticeable around the lips and nail beds. If the pupils of the eyes react to light by constricting (getting very small), this is a good sign, too. If you do not notice these changes, it is not necessarily hopeless because circumstances other than CPR may be involved.

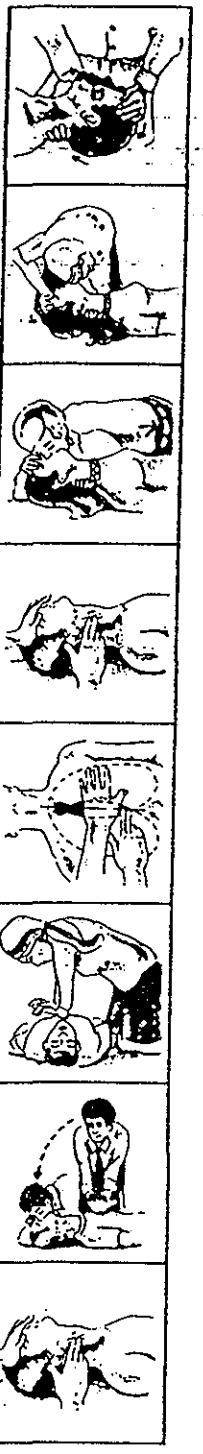
The primary indicators of effective CPR are seeing the chest rise when you breathe and someone feeling a pulse when you compress.

ONE PERSON RESCUE — CARDIAC ARREST

Combining all of the skills you have learned:



- Recognize unconsciousness
  Shake and Shout
  Call for help and position the victim
  Rolling as a unit
  4-10 seconds



- Open the airway
  Head tilt with neck lift or chin lift

- Check breathing — ear over the mouth
  Feel, listen, look
  3 - 5 seconds

- Begin rescue breathing if indicated
  Breathe four times rapidly, observe chest rise
  3 - 5 seconds

- Check carotid pulse, maintain head tilt
  5 - 10 seconds
  Have someone call an ambulance

- If no pulse is found, move so your knees are opposite the chest and locate the area for compression.

- Perform 15 external chest compressions, a little faster than 1 per second. Count aloud.
  Compression (downstroke) = release (upstroke).

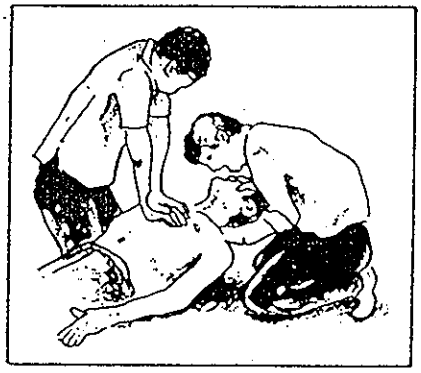
- Lean over quickly, open the airway. Take a deep breath, pinch the nose, and breathe two good, quick breaths to fill the lungs. Observe chest rise.

- Lean back, slide your fingers up the ribs for your landmark, reposition your hands for compression on the lower half of the sternum. Continue with the 15:2 ratio at the rate of 80 per minute.
  Check pulse and breathing after one minute (four cycles of 15:2). If pulseless, continue CPR with 2 breaths followed by cycles of 15 compressions and 2 breaths.

If you are still alone and assistance is unlikely after 1 minute of CPR, you may briefly stop to call an ambulace if a phone is readily available. Rapid access to the EMS system improves the victim's chances of survival.

TWO-PERSON RESCUE

Since rescue breathing must always accompany artificial circulation, it is desirable to have two rescuers. **RESCUER "A"** will be at the victim's side and perform external chest compression while **RESCUER "B"**, at the victim's head; keeps the airway open and continues rescue breathing. You learned, as a single rescuer, it is necessary to perform 60 compressions in approximately one minute to maintain adequate blood flow. You had to compress faster than once a second to allow time to stop compressions and breathe. In two person rescue, you can actually compress at a rate of 60 per minute, 1 compression per second, because there is no interruption for breaths. This rate is less tiring and allows optimum ventilation and circulation to be achieved by quickly interposing one breath after each 5 chest compressions, a 5:1 ratio. At one compression per second, there is time to breathe on the compressor's fifth upstroke without any interruption in compression rhythm. The 2-person rate of 60 may be maintained by counting 1-1/thousand, 2-1/thousand, 3-1/thousand, etc. Compress on the numbers and release on the thousand. The compressor is responsible for maintaining the smooth, equal compression rhythm; he does not pause for the ventilator. Interposing the breaths without any pauses in compression is important, since any interruption in chest compressions results in a drop in blood flow and blood pressure to zero.



When a second rescuer, "B" offers to assist, he should indicate that he is trained in CPR, open the airway with the head tilt, and check the victim's carotid pulse. If compressions are adequate to pump blood, he will feel a pulse with each compression.

Some information needs to be exchanged between the two rescuers, but CPR must not be interrupted. After an ambulance has been called, the compressor, initial **RESCUER "A"**, would accept the offer to change to 2-person CPR. While **"B"** is feeling for the compression-created pulse, he should indicate that he has found a good pulse or that he cannot find one, and "A" should reevaluate his compression technique.

When **RESCUER "B"** feels the pulse, he calls for compressions to stop for 5 seconds and checks for spontaneous pulse. Some find the end of a single rescue cycle of 15 compressions and 2 breaths a convenient time to call for the stop. IF THERE IS NO PULSE, **RESCUER "B"**, who is already in position for the pulse check, quickly breathes once and says, "No pulse, continue CPR." **RESCUER "A"** then resumes compressions with a 2-person count

(1-1/thousand, 2-1/thousand, etc.). Rescuers work best on opposite sides of the victim, but 2-person CPR is possible on the same side.

To switch positions without any significant interruption in the 5:1 rhythm, the compressor, **RESCUER "A"**, signals the change. Instead of the usual count of 1-1/thousand, 2-1/thousand, **"A"** says, "CHANGE 1/thousand, 2-1/thousand, 3-1/thousand, 4-1/thousand, 5-1/thousand". He may instead simply tell **"B"**, "CHANGE after your next breath" or other similar words which maintain the rhythm by replacing the usual 1-1/thousand to 5-1/thousand count.

When **RESCUER "A"** finishes his fifth compression, he quickly moves into position at the victim's head. **RESCUER "B"**, who is performing artificial ventilation, completes the 5:1 cycle with a breath and then positions himself at the chest to become the compressor. When **"B"** finishes his breath and moves, **"A"** immediately opens the airway and checks for spontaneous pulse and breathing for 5 seconds. During the pulse check, **"B"**, who now becomes the compressor, locates the proper hand position to resume compressions and waits for directions to continue. If the victim is still pulseless, **RESCUER "A"** should indicate no pulse, breathe once and say, "Continue CPR".

It is necessary to stop compressions every few minutes to check for spontaneous pulse and respiration; this is a convenient time to change positions. If the rescuers become very tired and change every minute or two, it is not necessary to check pulse each time they switch positions.

It is also important for the ventilator to frequently check for a pulse to assure that compressions are adequate. It may be necessary to tell the compressor to check his hand position or to press harder, if the pulse is not felt with each compression.

CONSCIOUS VICTIM WITH AN AIRWAY OBSTRUCTION

RESPIRATORY DIFFICULTY AT ANY AGE MAY ARISE FROM A FOREIGN OBJECT IN THE AIRWAY OR FROM OTHER CAUSES including infection of the airway, smoke inhalation, poisoning, near drowning or crib death in infants (SIDS). You should assess the probable cause of the obstruction from the circumstances surrounding the victim, so you can determine the proper management of the problem.

Foreign body obstruction may be associated with a person choking while eating. Contributing factors include: laughing and talking while chewing, alcoholic intake, poor fitting dentures, and attempts to swallow large pieces of unchewed food. Other causes of foreign body obstruction are persons running with food or gum in their mouths and infants or small children inhaling small toy pieces, coins, beads, balloons, etc. While the victim of any serious choking incident should be seen by a doctor, you may need to offer immediate assistance to the victim with a foreign body obstruction.

If obstruction from a foreign body is unlikely and the victim has had an illness affecting the airway, a cough, runny nose or high fever, you need immediate access to the emergency medical system.

THE VICTIM MAY HAVE A PARTIAL AIRWAY OBSTRUCTION WITH GOOD AIR EXCHANGE OR WITH POOR AIR EXCHANGE, OR HE MAY HAVE A COMPLETE OBSTRUCTION.

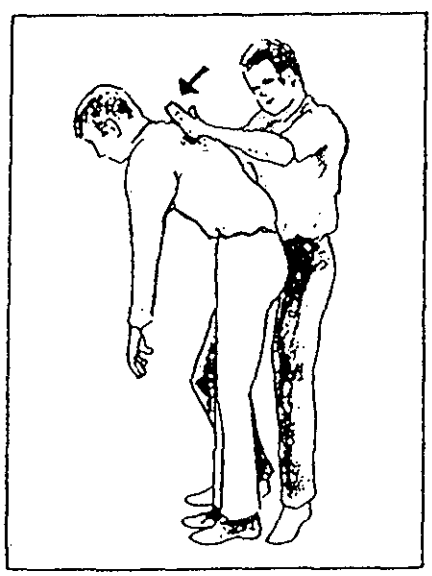
GOOD AIR EXCHANGE is present if the victim can cough forcefully, can respond when asked, "Can you speak?" or, if an infant can cry. Air exchange occurs when the victim exhales as he coughs and inhales a sufficient breath so he can cough again. A victim with a partially blocked airway may wheeze.

POOR AIR EXCHANGE is present if the victim can not cough forcefully or respond when asked, "Can you speak?" Other indications include high-pitched, crowing-like noises with respiration, increasing difficulty breathing, exaggerated movement of the chest and abdomen without comparable air movement at the mouth and nose and possibly cyanosis (a bluish color to the skin, especially around the lips and nail beds, resulting from decreased oxygen).

COMPLETE AIRWAY OBSTRUCTION is present when a victim is unable to cough or speak. Although you may see chest movement as the victim struggles to breathe, he will not be moving any air. His skin may have a bluish color. The victim will rapidly lose consciousness and die unless the obstruction is relieved.

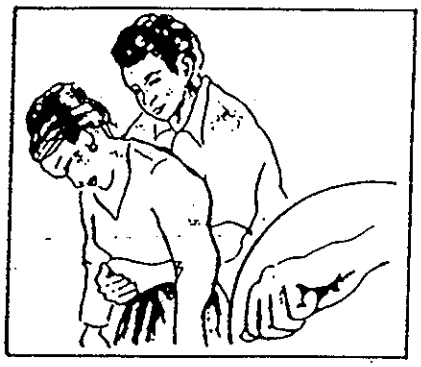
If you ever experience a foreign body airway obstruction, put your hand to your throat. This universal "distress signal of choking" will show people nearby that you need help.

- THE RESCUER'S RESPONSE TO THE CONSCIOUS VICTIM OF FOREIGN BODY OBSTRUCTION VARIES WITH THE SEVERITY OF THE PROBLEM. AS LONG AS THE VICTIM IS COUGHING EFFECTIVELY OR CAN SPEAK DO NOT INTERFERE with his attempts to expel the foreign body. You should tell him you are trained to help, reassure him, and encourage him to persist with spontaneous coughing and breathing efforts. STAY WITH HIM IF HE STARTS TO LEAVE THE ROOM.



The adult victim who is unable to speak, may be either sitting or standing. If he is standing, the rescuer stands with one foot beside and the other foot well behind the victim. This braces you to support the victim and positions you for both blows and thrusts. Support the victim by placing one hand on his sternum. If possible,

his head should be lower than his chest. Deliver a sharp blow to the spine between the shoulder blades with the heel of your other hand. As you learned with the unconscious obstructed victim, 4 blows may be delivered in rapid succession if needed.



If this fails to clear the obstruction, use manual thrusts. Each thrust has the potential of relieving the obstruction. Four thrusts may be repeated in rapid sequence if needed.

If you are going to perform CHEST THRUSTS, stand behind the victim. Slide your arms just under his armpits and around the chest. Place the thumb side of your fist on the middle of the sternum. Grasp it with the other hand and press with quick backward thrusts.

If you are going to use ABDOMINAL THRUSTS, wrap your arms around the victim's waist. Make a fist, place the thumb side of your fist against the victim's abdomen, slightly above the navel and below the xiphoid. Grasp your fist with the other hand. Press your fist into the victim's abdomen with a quick inward and upward thrust.

When you perform manual thrusts, the chair back or your body must support the victim. The action is with the hands; the arms do not press on the ribs. Repeat the four blows and four thrusts in rapid sequence until the obstruction is cleared or the victim becomes unconscious from the lack of oxygen.

If the victim becomes unconscious, slide him down your leg onto the floor, position him on his back, open the airway and immediately attempt to ventilate. This movement, combined with muscle relaxation, may have dislodged the obstruction enough for you to get air into the lungs. If you do not get a chest rise, activate the emergency medical system and proceed from that point with the combination of maneuvers you learned earlier for the unconscious, obstructed victim. (See page 17).

IF YOU ARE THE VICTIM AND ALONE, perform the maneuver on yourself. Press your fist into your upper abdomen as in conscious victim or lean forward and press your abdomen quickly over any firm object.

CAUTION: DO NOT THRUST WITH FORCE IN PRACTICE.

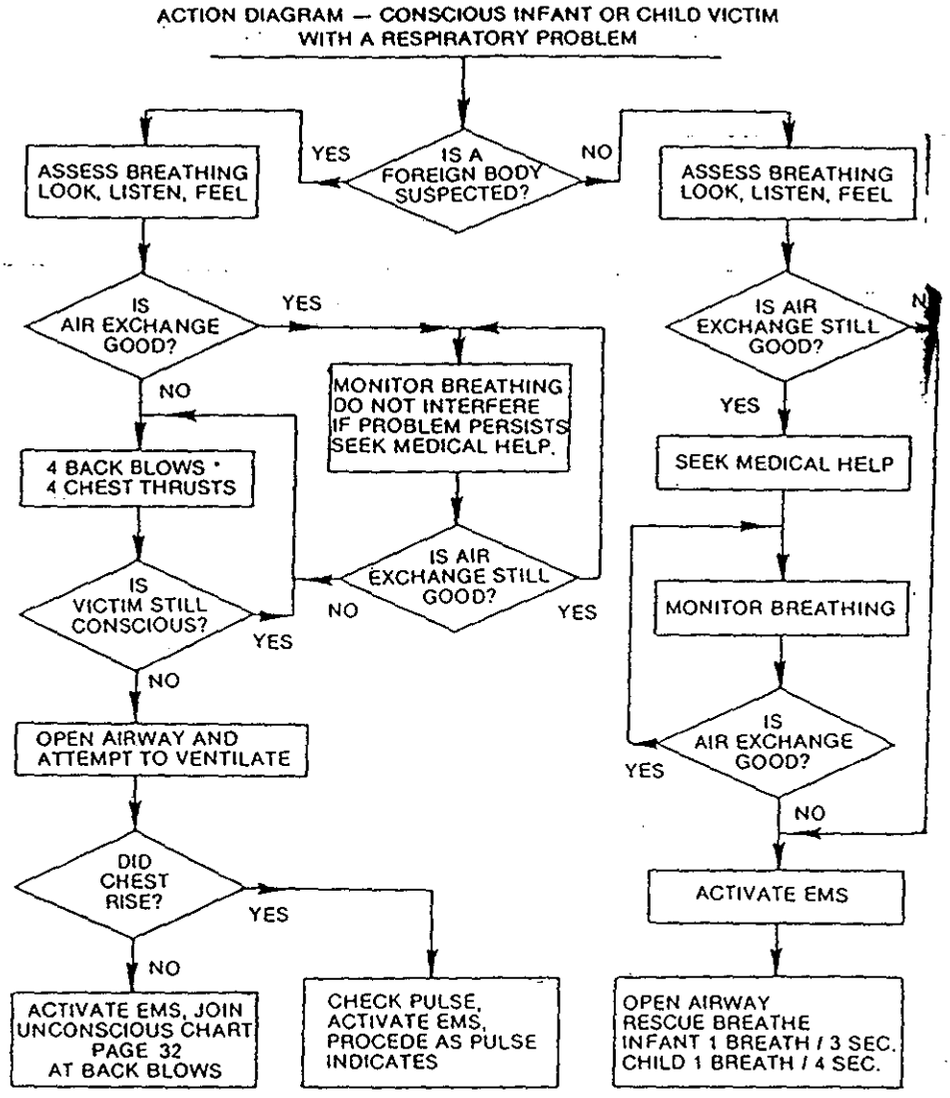
INFANTS AND CHILDREN

THE ABC's OF CPR FOR INFANTS AND CHILDREN HAVE THE SAME BASIC STEPS AS ADULT CPR WITH A FEW MODIFICATIONS.

Age groups have been established to help you relate technique to size. An infant is up to 1 year of age and a child from 1 to 8 years; adult procedures apply after 8 years.

Airway management and breathing problems are major concerns with infants and children. Respiratory problems are far more likely to occur than cardiac problems at this age.

Assess infant consciousness by gently tapping or shaking the baby. If the victim is conscious and has an airway obstruction, you must determine



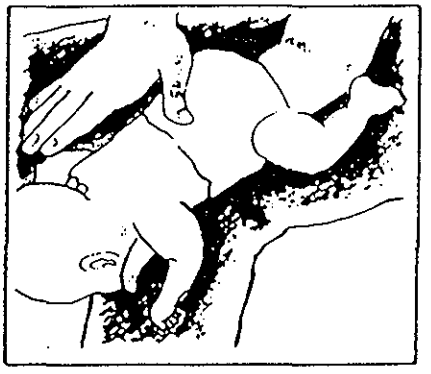
*REPEAT UNTIL EFFECTIVE. IF PROBLEM PERSISTS SEEK MEDICAL ADVICE

if there is GOOD or POOR air exchange or a COMPLETE OBSTRUCTION, as well as the probable cause of the obstruction (See pages 27-28).

THE ACTION DIAGRAMS IN THIS SECTION SHOULD EQUIP YOU TO DEAL WITH CHILDREN'S SPECIAL RESPIRATORY PROBLEMS AND POSSIBLE CARDIAC ARREST. THEY ARE BASED ON YOUR KNOWLEDGE OF ADULT CPR AND THE FOLLOWING SPECIAL TECHNIQUES FOR INFANTS AND CHILDREN.

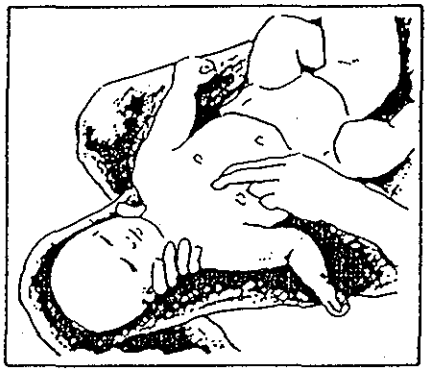
Infants are not simply little adults. The infant has a very small flexible airway, and his head is large in proportion to the rest of his body. To open the

airway, tilt the baby's head so the center back of the head is on the same surface (plane) as his back, as if he is sleeping on his back. Gently positioning the head using the head tilt-neck lift may require the use of a few fingers or the whole hand for neck support, depending on the victim's size. If the head tilt lifts the shoulders, slip your hand under the victim's back. This will maintain the open airway position and provide a firm surface, if chest compressions are necessary. DO NOT HYPEREXTEND AS THIS MAY ACTUALLY PINCH OFF THE AIRWAY.



To breathe for infants and small children, the rescuer covers both the mouth and nose of the victim with his mouth. The adult method of nose pinch and mouth seal may be used for larger children. THE VOLUME OF YOUR BREATH SHOULD BE ADJUSTED TO THE SIZE OF THE VICTIM. WATCH FOR A NORMAL CHEST RISE.

If conditions indicate a foreign body obstruction, different positioning techniques are used for infants and children. To deliver back blows, place the infant face down on your forearm, legs straddling your elbow; head and neck support are provided by resting the infant's chin in the curve between your thumb and index finger. The victim's head should be lower than the chest but should not be straight down. You can gain additional stability by resting your arm against your bent leg. The force of the blows is greatly reduced for infants and children.



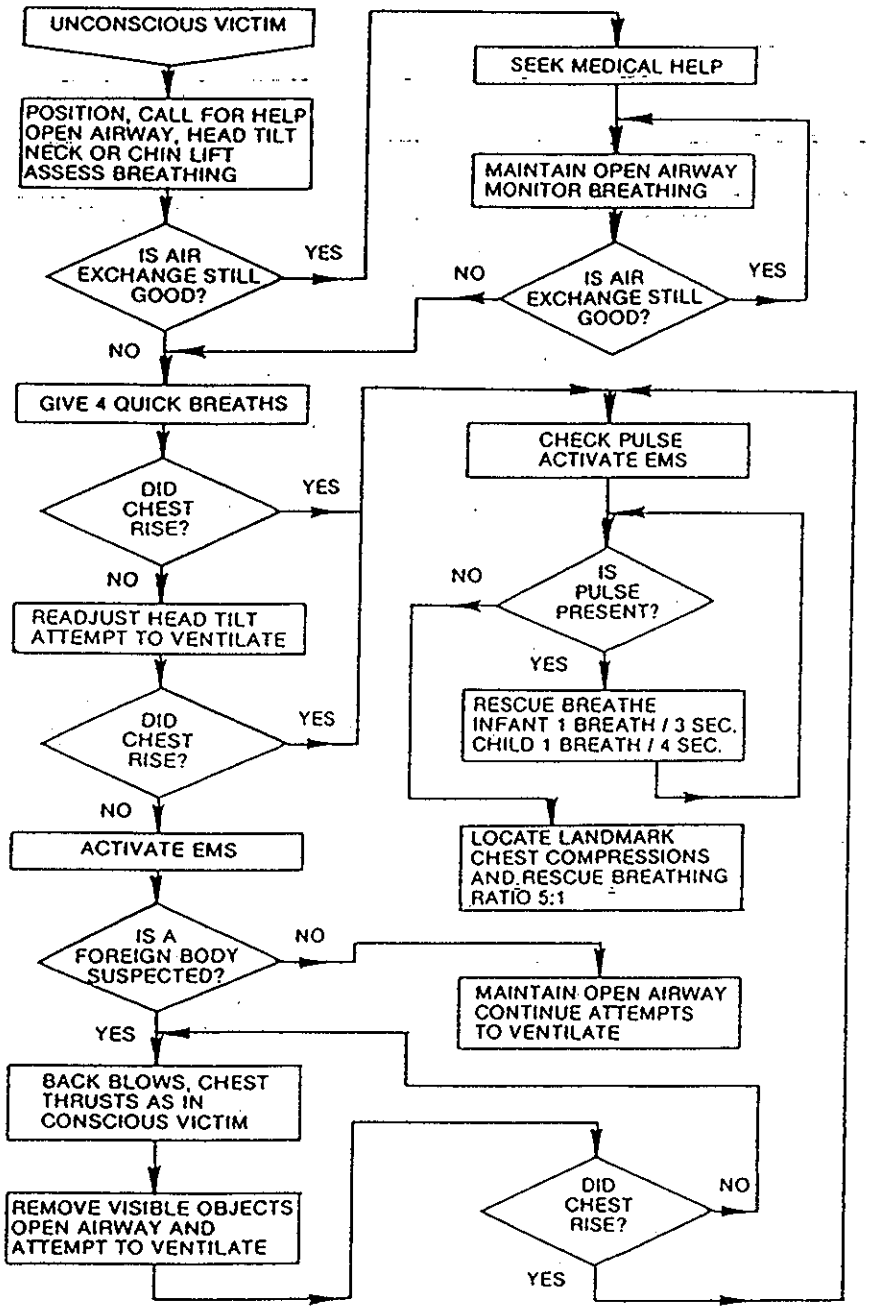
HEAD AND NECK SUPPORT MUST BE MAINTAINED WHILE POSITIONING THE INFANT ON HIS BACK FOR CHEST THRUSTS. Place the hand which you just used for back blows behind the infant's head and neck, with your wrist extending down the back. Turn the victim and rest your arm on your thighs with the infant slightly head down.

If the victim is too large to handle on your arms, kneel on the floor, legs together, and sit back on your heels. Lay the child head down across your lap to perform back blows. The child can then be gently rolled off onto the floor for chest thrusts.

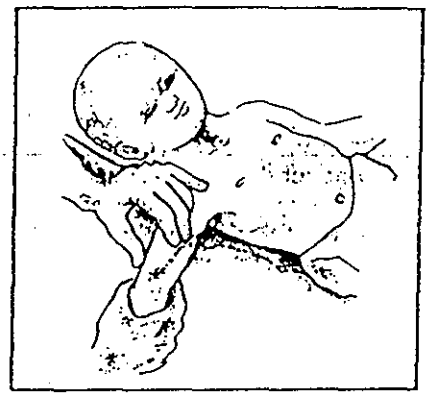
Abdominal thrusts are not recommended for infants and children. Chest thrusts of greatly reduced pressure are performed on infants with 2 or 3 fingers over the mid sternum at the nipple line. The position on the child is the same as the adult. Use one hand.

Do not sweep the mouth unless an object is visible.

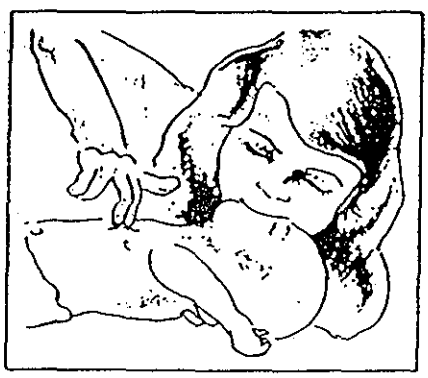
ACTION DIAGRAM — UNCONSCIOUS INFANT OR CHILD VICTIM
SINGLE RESCUER—CARDIOPULMONARY RESUSCITATION, CPR



The carotid pulse which is checked in children and adults is very difficult to find on an infant's short, fat neck. The apical beat of the heart, felt over the left nipple, is not a true pulse and is not always a reliable measure of actual circulation. Therefore, THE BRACHIAL PULSE IN THE UPPER ARM IS RECOMMENDED FOR INFANTS.



The brachial artery is found in the groove between the two muscles on the side of the upper arm that touches the body. Gently pull the arm away from the body and turn it palm up. Place your thumb on the outside of the arm just above the elbow and your first two fingers on the inside and press gently to feel the pulse.



SINCE THE INFANT'S HEART LIES HIGHER IN THE CHEST, THE PRESSURE OF CHEST COMPRESSIONS IS EXERTED OVER THE MID STERNUM (MIDWAY BETWEEN THE NIPPLES). As the baby grows, the heart and upper abdominal organs take proportionally less space and lower gradually to their adult positions. USE THE ADULT LANDMARK METHOD FOR CHILDREN.

The chest of an INFANT or child is smaller and more flexible than an adult, so much less pressure is required. Use the tips of 2 or 3 fingers to compress the infant sternum ½ to 1 inch. The compression rate for infants of 100 per minute is counted 1, 2, 3, 4, 5. A breath is delivered, after each 5 compressions; a single rescuer should pause sufficiently to assure effective ventilation (5:1 ratio).

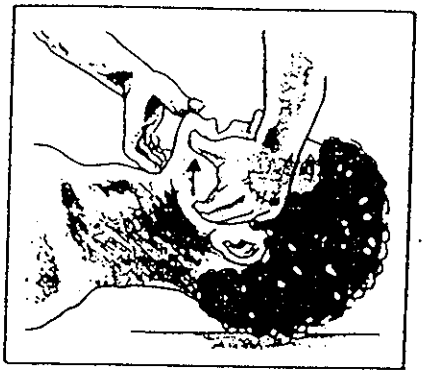
For CHILDREN the heel of one hand should produce the required 1 to 1½ inch compression. The child's heartbeat is slightly slower: compress at a rate of 80 times per minute, maintaining the 5:1 ratio.

ENRICHMENT

The material covered in this section deals with special conditions and would not be necessary in many rescue situations.

MODIFIED JAW THRUST — In accident cases, if there is a possibility of a neck fracture, caution must be used when positioning the victim and opening the airway. Neck injury should be suspected in drowning or automobile accidents, especially if the victim has facial cuts and bruises. In this case, all possible movement should be avoided. TO OPEN THE AIRWAY, A MODIFICATION OF THE JAW THRUST MANEUVER SHOULD BE USED. The fingers are placed behind the angle of the lower jaw to displace it forward

without tilting the head back or moving it to either side. This allows the head to be stabilized in a neutral position without extending the neck.



If required, artificial ventilation usually can be provided in this position by opening the lips with the thumbs. The victim's nose is sealed with your cheek as you breathe. If this is unsuccessful, the head should be tilted back very slightly, still using the modified jaw thrust maneuver, and another attempt made to ventilate.

1. d

2. c

RESCUE BREATHING — MOUTH-TO-NOSE METHOD — Mouth-to-nose ventilation may be used instead of mouth-to-mouth when there is extensive mouth injury, it is difficult to get a good seal, the mouth cannot be opened, or the rescuer simply prefers it.

3. d

4. d

When performing mouth-to-nose ventilations, one hand is left on the forehead to maintain the airway with the head tilt. The other hand lifts the lower jaw to close the mouth. The thumb can be used to seal the lips. The rescuer takes a deep breath, seals his mouth around the victim's nose and breathes forcefully while watching for a chest rise. He removes his mouth and watches the chest fall when the victim exhales. Open the victim's lips or mouth to allow the air to escape during exhalation because the soft palate may block the nasal passage.

5. d

6. b

MOUTH TO STOMA VENTILATION — If the victim has had his voice box removed (laryngectomy) he breathes through an opening (stoma) which connects the airway to the skin at the front of the neck just above the notch in the collarbone. This small opening may be hidden by a scarf or high neck shirt, but it can easily be detected by running your finger inside the neckline. The rescuer breathes directly through the stoma.

7. d

8. a

RELIEVING GASTRIC DISTENSION — A rescuer may elect to relieve gastric distension if it is severe enough to interfere with effective rescue breathing. To do this, roll the victim on his side and apply pressure on the upper abdomen. There is a high risk of regurgitation and a possibility of the victim inhaling his stomach contents causing further complications.

9. b

10. d

AIRWAY MANEUVERS — Abdominal thrusts and chest thrusts cause comparable air movement, thus either type may be effective in relieving an obstruction. Chest thrusts are especially useful in cases of advanced pregnancy or gross obesity. The chance of rib damage or internal injury with either method can be minimized by careful hand placement. Regurgitation is more likely to occur with abdominal thrusts

11. c

12. c

A combination of back blows and manual thrusts is felt to be the most effective method of relieving a foreign body airway obstruction. The blows

cause a rapid airway pressure increase while the thrusts produce a slower, more sustained pressure change. There is insufficient data to determine sequence effectiveness, so thrusts could precede blows instead of the generally accepted sequence of blows followed by manual thrusts.

ELECTRIC SHOCK — In addition to burns or injuries from falls, electric shock including lightning, may produce prolonged muscular contractions or paralysis of the muscles of respiration. This inability to breathe prevents air exchange leading to oxygen depletion and cardiac arrest. The shock may also disrupt heart rhythm.

THE RESCUER SHOULD EXERT GREAT CARE NOT TO TOUCH A VICTIM STILL IN CONTACT WITH AN ELECTRICAL SOURCE AS HE MAY ALSO BE SHOCKED. After properly clearing a victim from an energized object, begin to assess his status immediately. If spontaneous respiration or circulation is absent, the techniques of cardiopulmonary resuscitation should be initiated.

DROWNING — The rescuer should reach the victim as quickly as possible, preferably with the assistance of some flotation device. THE RESCUER MUST EXERCISE CARE TO PROTECT HIS OWN LIFE WHEN ASSISTING A DROWNING VICTIM.

Rescue breathing should be started as soon as possible. It may be performed when the rescuer can stand in shallow water or with flotation for support in deep water. You must be able to support the face above water. Do not be concerned about draining water from the lungs.

If back injury is suspected, float the victim onto a back support to remove him from the water. Use the modified jaw thrust to open the airway. When the victim is removed from the water, chest compressions should also be performed, if needed.

Victims of cold water drowning have been successfully resuscitated after 20 to 30 minutes in the water; give them a chance by initiating CPR. Every submersion victim should be promptly transported to an advanced life support facility.

SPECIAL CONSIDERATION — When CPR is not performed properly, rescue breathing and circulation may not be adequate to provide basic life support. CPR must not be interrupted for more than 5 seconds except for such circumstances as calling an ambulance when you are alone. Trained medical personnel will continue CPR as they move the victim pausing only if essential for such things as stairs or movement in and out of the vehicle and then for not over 30 seconds.

Complications from external chest compression can be reduced by good CPR technique developed through manikin practice. Even properly performed CPR can cause a sternal or rib fracture, a punctured lung or a lacerated liver.

WHEN A VICTIM IS IN RESPIRATORY OR CARDIAC ARREST, UNLESS YOU ARE TRAINED IN AND PROMPTLY APPLY EFFECTIVE CPR, THE ALTERNATIVE IS DEATH.

STUDY QUESTIONS

Mark your answers on a piece of study paper. To check your work, slide back the edge of the question page. Answers will appear on the edge of the page underneath.

1. **Before beginning rescue breathing and chest compressions, you must**
   a. Find out the cause of the victim's collapse
   b. Obtain permission from the victim's family
   c. Check for medical information in victim's wallet or on a bracelet or necklace
   d. Be sure victim is breathless and pulseless
2. **If slight gastric distension occurs in a victim as a result of artificial ventilation the rescuer should**
   a. Apply manual pressure over the victim's upper abdomen to relieve the pressure
   b. Keep the victim's head and shoulders higher than the chest
   c. Reposition the airway and breathe only enough to get a normal chest rise without attempting to expel the air from the stomach
   d. Keep the victim's head and shoulders lower than the chest
3. **The most common cause of airway obstruction in an unconscious victim is**
   a. Food
   b. Mucous
   c. Dentures
   d. Tongue
4. **If a victim is coughing and wheezing from a partial foreign body obstruction in the airway, a potential rescuer should**
   a. Give four back blows and four manual thrusts
   b. Give only back blows
   c. Give back blows and something to drink
   d. Not interfere
5. **In order to initiate CPR on a drowning victim**
   a. Start cardiac compressions before the victim is removed from the water
   b. Drain water from the lungs before ventilating
   c. Do not tilt the head back since it may cause vomiting
   d. Begin mouth-to-mouth ventilations in the water, if possible
6. **Cardiac arrest in infants and children usually results from**
   a. Heart attack
   b. Respiratory arrest
   c. Electric shock
   d. Drowning
7. **Which of these can cause failure to ventilate the victim's lungs adequately**
   a. Excessive air in the stomach
   b. Inadequate head tilt
   c. Lack of an airtight seal
   d. All of the above
8. **To open the airway of a victim with suspected neck fracture, the rescuer should**
   a. Perform the modified jaw thrust maneuver, without head tilt
   b. Attempt to ventilate without moving the victim
   c. Not do anything until a physician arrives
   d. Tilt the neck backwards
9. **The *most* reliable indicator of effective rescue breathing is**
   a. The patient loses much of his blue color
   b. You can see the victim's chest rise and fall
   c. When you blow into the victim's mouth, air enters easily
   d. The pupils of the eye become constricted
10. **Complications which may result from chest compressions even when properly performed include**
    a. Punctured lungs
    b. Laceration of the liver
    c. Fractured ribs and sternum
    d. All of the above
11. **Excessive artificial ventilation pressures**
    a. Cause no harm to the cardiac arrest victim
    b. Affect only adult victims
    c. May cause stomach distention in any victim
    d. Affect only infant and children victims
12. **When establishing unresponsiveness in an infant the rescuer should**
    a. Gently blow into the infant's ear
    b. Pick up the infant by the ankles and gently shake
    c. Gently tap or shake the infant
    d. Deliver a chest thrust

26. a
27. b
28. b
29. b
30. b
31. a
32. d
33. d
34. a
35. a
36. a
37. c
38. d

13. **The modified jaw thrust used to open the airway for victims of suspected neck injury, probably would not be used for**
    a. A drowning victim
    b. A heart attack victim slumped in a chair
    c. A child who fell from a tree
    d. An accident victim thrown from a car
14. **The universal distress signal characterizing an apparent obstructed airway in the conscious adult is**
    a. Rapid heavy breathing
    b. Violent choking
    c. Victim's hand at his throat
    d. Violent thrashing of the arms
15. **In order to provide CPR for a pulseless adult victim (given two rescuers), do not**
    a. Compress sternum 1½ to 2 inches
    b. Give one breath after every five compressions
    c. Perform 60 compressions each minute at rate of one/second
    d. Pause briefly after every fifth compression to allow for one breath
16. **Gastric distension during CPR**
    a. Is a possible complication of rescue breathing with air entering the stomach
    b. Never occurs in adults
    c. Is never a problem, so ignore it
    d. Occurs when exhalation is not completed between breaths
17. **The incidence of gastric distension can be minimized by**
    a. Ventilating at a slower rate
    b. Pressing hard to seal the mouth better
    c. Decreasing the nose pinch to allow some air to escape
    d. Properly opening the airway and limiting ventilation volume to the amount which causes a normal chest rise
18. **If, after 10 seconds, the rescuer cannot detect a carotid pulse in an unconscious adult victim, he should**
    a. Begin rescue breathing
    b. Activate the EMS system and begin external chest compressions
    c. Deliver 4 back blows and 4 manual thrusts
    d. Check the femoral pulse
19. **The heart lies between**
    a. The clavicle and the scapula
    b. The sternum and the spine
    c. The clavicle and the spine
    d. The sternum and the xiphoid
20. **One circumstance under which a non-physician may discontinue CPR is**
    a. When the rescuer thinks the victim will not survive
    b. When the rescuer suspects the victim will suffer permanent brain damage
    c. When the rescuer is exhausted and unable to continue
    d. When the rescuer sees no reaction of the pupils or other sign of life
21. **In performing CPR the chest of the infant should be compressed**
    a. ½ to 1 inch
    b. 1 to 1½ inches
    c. 1½ to 2 inches
    d. 2 to 2½ inches
22. **The guidelines and standards for CPR on a child apply, in general, for children**
    a. Under 1 year of age
    b. 1-8 years of age
    c. 8-10 years of age
    d. 10-12 years of age
23. **What condition should exist before the rescuer attempts to revive a victim by performing CPR**
    a. Permanent brain damage has occurred
    b. Evidence that breathing and pulse are absent
    c. The victim's pupils are dilated
    d. The victim has shallow respirations
24. **When the rescuer is alone with a cardiac arrest victim and there is no possibility of someone else arriving at the scene the rescuer should**
    a. Telephone for help before starting CPR
    b. Do nothing and wait for help to arrive
    c. Open the victim's airway then telephone for help
    d. Perform CPR for one minute then telephone for help
25. **When switching places during two-rescuer CPR**
    a. The rescuer at the head of the victim checks the pulse before moving
    b. The rescuer at the head signals when to switch
    c. The rescuer at the chest signals when to switch
    d. The rescuer at the head gives two quick breaths before moving

52. d 26. **To determine if an obstructed airway situation exists in a conscious adult or child the rescuer should**
   a. Ask the victim "Can you speak?"
   b. Shake the victim
   c. Deliver four back blows
   d. Perform four manual thrusts

53. a 27. **Recognition signs of a partial airway obstruction with poor air exchange in a small child are the child is unable to speak or cry and he may**
   a. Immediately sustain cardiac arrest
   b. Produce a high pitched crowing like noise while breathing
   c. Show heavy rapid breathing

54. d 28. **Which is the rate of compressions and ventilations when performing a two-person rescue**
   a. 15 to 1
   b. 5 to 1
   c. 8 to 2
   d. 10 to 2

55. d 29. **Since successful resuscitation of drowning victims has been reported after prolonged periods of submersion in cold water,**
   a. Leave drowning victims in the water for as long as possible
   b. Initiate CPR even if the victim has been submerged for 20-30 minutes or more
   c. Delay CPR because of the hypothermia effect
   d. Use the back pressure-arm lift method of resuscitation

56. b 30. **Keeping the heel of the hand lightly in contact with the chest during the relaxation phase of chest compression is important because**
   a. Over-expansion of the chest is avoided
   b. Correct hand position can be maintained
   c. Stomach distension can be prevented
   d. The heartbeat can be felt

57. b 31. **When one rescuer performs CPR on an adult victim, the recommended *rate* for cardiac compressions is**
   a. A little faster than one compression per second
   b. A little slower than one compressions per second
   c. Exactly one compression per second
   d. Fifteen compressions per minute

58. b 32. **If breathing does not seem to be present after you have opened the airway**
   a. Begin chest compressions
   b. Give blow to back
   c. Check pupils
   d. Attempt mouth-to-mouth ventilation

59. c 33. **CPR may be discontinued**
   a. When the rescuer suspects that ribs are fractured
   b. When the victim has a neck fracture
   c. When the ambulance driver says the victim looks dead
   d. When the victim's pulse and respiration are restored

60. c 34. **CPR is most effective when it is started immediately after an arrest, however there is a good chance of the victim being returned to his pre-arrest level of brain function if CPR is started in the first _____ minutes.**
   a. 4-6
   b. 6-10
   c. 8-10
   d. 10-12

61. d 35. **CPR may not be indicated**
   a. In cases of known terminal irreversible illness
   b. On victims who may incur permanent brain damage
   c. Unless a physician is present
   d. If after 15 minutes the CPR effort appears to be unsuccessful

62. c 36. **During one-rescuer CPR, how often should a rescuer palpate the carotid pulse to check for return of a spontaneous effective heartbeat**
   a. After the first minute of CPR and every few minutes thereafter
   b. After the first five minutes of CPR and every five minutes thereafter
   c. Every ten minutes
   d. Every fifteen minutes

63. b 37. **Which of the following is the *best* indication to let a rescuer know that his external chest compressions are producing adequate blood flow**
   a. Change in patient's color
   b. Constriction of pupils
   c. A second person feels a pulse in the carotid artery with each compression
   d. There is no way to determine this without special instruments

64. d 38. **If early warning signs indicate a stroke**
   a. The victim may need only to have an open airway maintained
   b. The victim should seek entry into the emergency medical system
   c. CPR may be indicated if a cardiac arrest occurs in addition to the stroke
   d. All of the above

39. **To determine if an adult victim is pulseless, check for a pulse**
    a. At the carotid artery in the neck
    b. At the femoral artery in the groin
    c. At the brachial artery in the arm
    d. At the radial artery in the wrist

40. **During external chest compression, if the rescuer's hands are placed too low on the sternum the**
    a. Collarbone may be fractured
    b. Lungs may be lacerated
    c. Liver may be lacerated
    d. Heart may be bruised

41. **When switching places during two-rescuer CPR, the pulse check is performed by the**
    a. Rescuer at the head before moving to the chest
    b. Rescuer at the head after moving to the chest
    c. Rescuer at the chest after moving to give ventilations, but before ventilating
    d. Rescuer at the chest after beginning ventilations

42. **To provide a proper seal for mouth-to-mouth breathing the rescuer should**
    a. Gently pinch the nose to prevent air loss
    b. Open his mouth very wide and fully cover the victim's mouth
    c. Seal both mouth and nose with his mouth, if the victim is an infant
    d. All of the above

43. **Which of these persons is likely to be a victim of airway obstruction?**
    a. A stroke victim
    b. A person suffering drug intoxication
    c. A person with something in his windpipe
    d. All of the above

44. **To perform chest compressions on an adult, one hand is placed on the top of the other with the heel of the lower hand pressing**
    a. On the lower one-half of the sternum
    b. On the upper third of the sternum
    c. On the middle of the sternum
    d. On the xiphoid process

45. **When opening the airway of an infant, do not exaggerate the head tilt because**
    a. It permits the accumulation of mucous and saliva
    b. It may obstruct the breathing passages
    c. It prevents an airtight seal
    d. It causes the tongue to lodge in the back of the throat

46. **The principal method used for opening the airway in most cases is**
    a. Head tilt, with either neck lift or chin lift
    b. Turning the head to one side
    c. Striking the victim on the back
    d. Wiping out the mouth and throat

47. **The rescuer should palpate the infant's pulse by**
    a. Feeling for the carotid pulse in the neck
    b. Feeling for the brachial pulse in the arm
    c. Feeling for the radial pulse in the wrist
    d. Feeling for the femoral pulse in the groin

48. **How much time may be taken initially to make sure the individual does not have a pulse**
    a. Five seconds
    b. Ten seconds
    c. Fifteen seconds
    d. Twenty seconds

49. **The primary concern in emergency cardiac care for a heart attack victim is**
    a. Transportation of the victim to the hospital
    b. Getting a doctor to the scene
    c. Stabilization of the victim at the scene and continued stabilization during transport

50. **When mouth-to-nose ventilation is used, it may be necessary for the rescuer to**
    a. Open the victim's mouth or lips to allow air to escape during exhalation
    b. Turn the victim's head to the side between ventilations
    c. Open the airway by pulling the nostrils back
    d. Blow as hard as he can so that air will enter the lungs

51. **What should you do first for a collapsed victim of illness or accident**
    a. Open the airway
    b. Establish unresponsiveness
    c. Administer the abdominal thrust
    d. Examine the victim's mouth for foreign bodies

13. b
14. c
15. d
16. a
17. d
18. b
19. b
20. c
21. a
22. b
23. b
24. d
25. c

77. c
78. d
79. c
80. d
81. c
82. d
83. d
84. c
85. b
86. b
87. b
88. a
89. a

52. **The symptoms of a heart attack**
    a. May be mild and ignored, or attributed to some other cause
    b. May occur suddenly without warning
    c. May subside and return
    d. May include all of the above
53. **A significant increase in successful resuscitation of out-of-hospital cardiac arrest victims is possible if**
    a. CPR is started promptly by a trained bystander and a paramedic team can be accessed rapidly
    b. A doctor is called as well as the ambulance
    c. Resuscitation attempts are not started until paramedics arrive with special equipment
54. **The most serious danger of heart attack is**
    a. Paralysis
    b. Mental depression
    c. Severe pain in the chest
    d. Respiratory and cardiac arrest
55. **A person experiencing a heart attack may say that it felt like**
    a. Someone was standing on my chest
    b. A belt was being pulled around my chest
    c. Bad indigestion
    d. Any of the above
56. **The proper rate of rescue breathing in the adult is**
    a. 4 times per minute
    b. 12 times per minute
    c. 20 times per minute
    d. 28 times per minute
57. **When performing CPR on an *infant*, the compression rate is**
    a. 80 times a minute
    b. 100 times a minute
    c. 120 times a minute
    d. 140 times a minute
58. **A rescuer's first effort to assure that the victim's airway is open should be**
    a. To listen to the chest for breathing sounds
    b. To properly position the head
    c. To clear foreign matter from the throat
    d. To shake shoulder and shout "Are you OK?"
59. **When two rescuers are performing CPR, the rescuer giving chest compressions**
    a. Should pause after every fifth compression while the second rescuer gives ventilations
    b. Should pause after every twelfth compression while the second rescuer gives ventilations
    c. Should not pause while the second rescuer interposes ventilations during the upstroke of each fifth compression
    d. Should not pause after compressions except in the case that he becomes tired
60. **The ABC's of CPR stand for**
    a. Airway-Breathing-Cardiac Compression
    b. Adjuncts-Breathing-Carotid Pulse
    c. Airway-Breathing-Circulation
    d. Airway-Back Blows-Chest Thrust
61. **CPR should not be interrupted**
    a. For more than 1 second to check responsiveness
    b. For more than 20 seconds for any reason
    c. For more than 10 seconds with *no* exceptions
    d. For more than 5 seconds *except* in certain circumstances
62. **When performing external chest compression on an adult, the sternum should be depressed**
    a. ½ to 1 inch
    b. 1 inch to 1½ inches
    c. 1½ inches to 2 inches
    d. 2 to 2½ inches
63. **The pulse of a victim suspected to be in cardiac arrest should be checked**
    a. Immediately after opening the airway
    b. After the first four ventilations
    c. After the first two ventilations
    d. Before beginning ventilations
64. **For chest compression to be most effective, you must**
    a. Allow the chest on release to return to its normal position
    b. Have compression time equal to release time
    c. Not have a pause between compressions
    d. All of the above

65. **Basic Life Support is that phase of emergency cardiac care that includes**
    a. Early recognition of a cardiac or respiratory emergency
    b. Intervention to gain prompt entry into the emergency medical system
    c. Application of rescue breathing and chest compressions, if the victim arrests
    d. All of the above
66. **When compressing the chest of a child**
    a. Use the tips of 2 or 3 fingers of one hand
    b. Use the heel of one hand
    c. Use the heels of both hands
    d. Use the thumbs of both hands
67. **One can determine if an unconscious victim is breathing by**
    a. Checking the blood pressure
    b. Checking for cyanosis
    c. Checking the pulse
    d. Looking, listening, feeling for signs of air and chest movement
68. **If a lone rescuer finds a non-breathing and pulseless victim lying face down at the scene of an auto accident, and the rescuer suspects that the victim has a back injury, what should the rescuer do**
    a. Turn the victim as a unit and begin CPR
    b. Turn the victim's head to one side and begin CPR
    c. Do nothing and wait until help arrives
    d. Attempt to apply CPR with the victim in the face-down position
69. **For a conscious victim with a complete airway obstruction, the rescuer should**
    a. Perform a finger probe to remove the obstruction and attempt to ventilate
    b. Deliver 8 manual thrusts and perform a finger probe
    c. Deliver 4 back blows and perform a finger probe
    d. Deliver 4 back blows and 4 manual thrusts until effective, or until the victim becomes unconscious
70. **A weak ineffective cough, high pitched noises while breathing, increasing respiratory difficulty and cyanosis (bluish complexion) are signs of**
    a. A partially obstructed airway with good air exchange
    b. A partially obstructed airway with poor air exchange
    c. A totally obstructed airway
    d. A heart attack
71. **In mouth-to-mouth resuscitation the victim's dentures routinely should be**
    a. Removed because they contain bacteria
    b. Left in (unless unusually loose) to facilitate making an airtight seal
    c. Removed because they frequently obstruct the airway
    d. Left in because it is illegal to remove them without the victim's consent
72. **The greatest risk of death from a heart attack occurs within**
    a. The first two hours after onset of symptoms
    b. Two to eight hours after onset of symptoms
    c. Eight to twelve hours after onset of symptoms
    d. Twelve to twenty-four hours after onset of symptoms
73. **If vomiting occurs during a resuscitation effort, the best immediate procedure to follow is**
    a. Stop CPR until help arrives
    b. Pause for a moment until the patient appears quiet again, then resume mouth-to-mouth ventilation
    c. Switch to mouth-to-nose ventilation
    d. Turn the victim's body to the side, sweep out the mouth and resume CPR
74. **After opening the airway if a rescuer sees chest movement in an unconscious victim, he should**
    a. Not initiate any CPR procedure
    b. Assume the victim is breathing
    c. Listen and feel for breathing with ear near victim's mouth
    d. Perform only chest compressions
75. **The proper rate of rescue breathing in an infant is**
    a. 10 ventilations per minute
    b. 20 ventilations per minute
    c. 30 ventilations per minute
    d. 40 ventilations per minute
76. **When performing the head tilt-neck lift, the hand lifting the neck should be placed**
    a. Under the shoulders between the shoulder blades
    b. Under the neck close to the back of the head
    c. Under the neck close to the shoulders
    d. On the forehead

39. a
40. c
41. c
42. d
43. d
44. a
45. b
46. a
47. b
48. b
49. c
50. a
51. b

77. **An arrest victim is lying on his back in bed. To perform effective CPR you should**
    a. Elevate his head and his feet
    b. Place a pillow under his head
    c. Place something solid underneath his back or perhaps place him on the floor
78. **All of the following are risk factors of a heart attack except**
    a. Cigarette smoking
    b. High blood fat-cholesterol level
    c. High blood pressure
    d. Nausea and vomiting
79. **Attempt back blows and manual thrusts to relieve a foreign body airway obstruction only in cases of**
    a. Total airway obstruction
    b. Partial airway obstruction with poor air exchange
    c. Either a or b
    d. Partial airway obstruction with good air exchange
80. **When one rescuer performs CPR, the ratio of chest compressions to lung inflations for any adult victim is**
    a. 7 compressions to 1 ventilation
    b. 5 compressions to 1 ventilation
    c. 12 compressions to 2 ventilations
    d. 15 compressions to 2 ventilations
81. **The heart attack victim's most common reaction to symptoms of heart attack is to**
    a. Panic and faint
    b. Call for a doctor
    c. Deny that he might be having a heart attack
    d. Drive to a hospital
82. **Respiratory arrest is characterized by minimal or absent respiratory effort, failure of the chest or upper abdomen to move, and**
    a. Having the ability to speak
    b. Cardiac arrest
    c. Swelling of the tongue
    d. No air movement through nose or mouth
83. **Using 4-10 seconds to establish unresponsiveness in collapsed victims is important because**
    a. The victim may have only fainted
    b. It may prevent unnecessary resuscitation efforts
    c. The person may just be asleep
    d. All of the above are important reasons
84. **Interruptions in chest compressions result in**
    a. Dangerous build-up of carbon dioxide in the lungs
    b. Over-filling of the heart chambers
    c. A reduction of the blood flow and blood pressure to zero
    d. Little change in blood flow and blood pressure
85. **The carotid artery blood flow resulting from properly performed chest compression on a cardiac arrest victim is approximately _____% of normal.**
    a. 10 - 15
    b. 25 - 35
    c. 40 - 50
    d. 60 - 80
86. **Whenever a second rescuer is available, he should**
    a. Stand-by to take over when first rescuer is tired
    b. Assist first rescuer in two-rescuer CPR
    c. Watch first rescuer to be sure CPR is done correctly
    d. Take over for the first rescuer immediately
87. **Chest compression must always be accompanied by**
    a. Manual thrusts
    b. Artificial ventilations
    c. Relief of gastric distension
    d. Administration of drugs
88. **In order to determine correct location for chest compressions**
    a. Trace the rib margin into the notch where the ribs meet and place one finger on the end of the sternum
    b. Find the navel and measure 2 hands above it
    c. Estimate the appropriate place and put hands into position
    d. Find the upper margin of the sternum and put hands directly below it
89. **A child awakens during the night making high pitched crowing like sounds and exaggerated efforts to breathe. When you open the airway and assess breathing, there is poor air exchange**
    a. Call an ambulance and begin rescue breathing
    b. Do not interfere while the child is trying to breathe
    c. Deliver back blows and abdominal thrusts

90. **Infants and small children are ventilated in basically the same way as adults, except that inflations are** — 65. d
    a. Faster and more forceful for children
    b. Slower and more forceful for children
    c. Faster and less forceful for children
    d. Slower and less forceful for children
91. **If an infant has a complete foreign body airway obstruction not relieved by back blows, the rescuer should** — 66. b
    a. Administer four abdominal thrusts
    b. Administer four additional back blows
    c. Administer four chest thrusts
    d. Turn the infant upside down and shake
92. **If the rescuer's efforts to perform rescue breathing do not result in the victim's chest rising, the rescuer should** — 67. d
    a. Reposition the head tilt and try again
    b. Perform four back blows and try again
    c. Perform four manual thrusts and try again
    d. Sweep out the mouth and try again
93. **The correct way to roll the victim to deliver back blows is** — 68. a
    a. Away from the rescuer onto his chest face down on the floor
    b. Away from the rescuer onto his side
    c. Toward the rescuer onto his side with his chest against the rescuer's legs
94. **If a second rescuer determines that the first rescuer's chest compressions are not producing a carotid pulse** — 69. d
    a. The first rescuer should be told to recheck his landmark and reevaluate his compression technique, as he continues CPR
    b. The first rescuer should check the pulse himself
    c. The second rescuer should insist on taking over
    d. The first rescuer should ignore the second rescuer and continue CPR
95. **A 45 year old man complains of a sensation of pressure in his chest, extreme fatigue, and begins to have nausea with vomiting. You should** — 70. b
    a. Tell him to take aspirin and stay in bed
    b. Tell him to see a doctor the next morning
    c. See that he takes fluids
    d. Arrange immediate transportation to the nearest emergency facility
96. **If only breathing is arrested in an adult victim** — 71. b
    a. Breathe once every 5 seconds
    b. Continue breathing until breathing is restored or relieved by competent personnel
    c. Gain entry into the emergency medical system
    d. All of the above
97. **One purpose of "Good Samaritan" legislation is** — 72. a
    a. To require all medical professions be trained in CPR
    b. Protect training institutions
    c. To minimize possible legal consequences to the rescuer for providing CPR
98. **External chest compression for a pulseless victim is too hazardous to perform** — 73. d
    a. If the patient has numerous rib fractures
    b. If neck injury is present
    c. Following open heart surgery
    d. None of the above
99. **The number one cause of death in the United States is** — 74. c
    a. Cancer
    b. Accidents
    c. Heart and blood vessel disease
    d. Stress
100. **When the rescuer palpates the pulse of the adult victim with one hand, the other hand of the rescuer should** — 75. b
    a. Maintain the head tilt
    b. Sweep out victim's mouth
    c. Feel chest for movement
    d. Find landmark for compressions

76. b

PERFORMANCE SHEET FOR ONE AND TWO RESCUER CPR

	SKILL STEPS	ACTIVITY AND TIME (Seconds)	CRITICAL PERFORMANCE	REF. PG.	PASS
ONE RESCUER	1	Establish unresponsiveness and call out for help. Allow 4-10 sec. if face down and turning is required.	Tap, gently shake shoulder, shout, "Are you OK?" Call out, "Help!" Turn if necessary supporting head and neck. Victim on hard surface. Adequate time for assessment.	12 13	☐
	2	Open airway. Establish breathlessness. (Look, listen, and feel (3-5 sec.)	Kneels properly. Use head tilt with neck lift or chin lift to open airway. Ear over mouth, observe chest, listen and feel for breathing.	13 15	☐
	3	Four ventilations.* (3-5 sec.)	Ventilate properly 4 times and observe chest rise. Avoid gastric distension.	16 20	☐
	4	Establish pulselessness. Simulate activation of EMS System. (5-10 sec.)	Fingers palpate for carotid pulse on near side (other hand on forehead maintains head tilt.) Adequate time to assess pulse. Know local EMS number and send a bystander to call EMS.	19 20	☐
	5	Four cycles of 15 compressions and 2 ventilations. (54-66 sec.)	Proper rescuer body position. Landmark - check hand position each time. Correct position of hands to avoid injury. Vertical compression/no bouncing. Counts aloud to establish rhythm. Proper rate and ratio. Ventilates properly, observes chest rise.	21 24	☐
	6	Check for return of pulse and breathing. (3-5 sec.)	Check for pulse and spontaneous breathing to evaluate victim's status.	24	☐
	7	1st rescuer resumes CPR with 2 ventilations followed by compressions.	Ventilates properly then resumes single rescue technique with cycles of 15:2.	24	☐
		In training only one person ventilates the manikin; the other simulates breaths.			
TWO RESCUER	8	2nd rescuer identifies himself. Checks pulse for effective compressions. (5 sec.)	2nd rescuer says, "I know CPR" Palpates carotid pulse to evaluate effectiveness of compressions.	26	☐
	9	2nd rescuer calls out, "Stop compressions" and checks for spontaneous pulse and breathing. (5 sec.)	2nd rescuer - 5 sec. spontaneous pulse and breathing check. Informs 1st rescuer of victim's status and the need to rescue breathe only or continue CPR if no pulse.		☐
	10	2nd rescuer ventilates once Says, "No pulse. Continue CPR."	Ventilates properly and observes chest rise. Says, "Continue CPR."		☐
	11	1st rescuer resumes compressions	Changes to two rescuer rate and ratio.		☐
	12	Minimum of 6 cycles of 5 compressions and 1 ventilation (8-10 sec.)	Correct rate of compression. Counts aloud. No pause for ventilations. Interposes breath on 5th upstroke.	26	☐
	13	Compressor calls for switch	Calls for switch when needed.	27	☐
	14	*Simultaneous switch* Rescuer at head moves to chest.	Gives breath on 5th compression upstroke. Moves to chest. Finds correct hand position ready to resume chest compressions.		☐
		Compressor moves to head.	Gives 5th compression. Moves to head. 3-5 sec. pulse check. Ventilates once. Says, "No pulse. Continue CPR." Monitors compression effectiveness.	27	☐

Switch and repeat steps 12-14 until examiner is satisfied.

*If ventilations are unsuccessful, reopen airway and reattempt ventilations.

INSTRUCTOR: _____ Pass-One Rescuer CPR ___ Two Rescuer CPR ___

PERFORMANCE SHEET FOR INFANT RESUSCITATION

SKILL STEPS	ACTIVITY AND TIME (Seconds)	CRITICAL PERFORMANCE	REF. PG.	PASS
1	Establish unresponsiveness and call out for help. (including turning) (4-10 sec.)	Tap, gently shake shoulder, and see if infant responds. Call out - "Help!" Turn if necessary supporting head and neck. Infant horizontal to aid circulation. Adequate time to assess unresponsiveness or breathing difficulty.	29 30 12	☐
2	Open airway. Establish breathlessness. (Look, listen, and feel.) (3-5 sec.)	Tip head back. Do not hyperextend. Put ear over mouth, observe chest. Look, listen, feel for breathing.	30 31 15	☐
3	Four ventilations* (3-5 sec.)	Cover mouth and nose. Give 4 ventilations in rapid succession with enough pressure to make chest rise. Avoid over-inflation to prevent gastric distension.	31 20	☐
4	Establish pulselessness. Simulate activation of EMS System. (5-10 sec.)	Fingers palpate for brachial pulse in infant. Know local EMS number and send a bystander to call EMS.	33 19 20	☐
5	10 cycles of 5 compressions and 1 ventilation. Continue uninterrupted. (30 sec.)	Two fingers on mid-sternum for compressions at rate of 100 compressions per minute. Breath interposed every 5 compressions.	33	☐
6	Check for return of spontaneous pulse and breathing. (3-5 sec.)	Properly check pulse and breathing to assess victim's status.	24	☐
7	Resume CPR with 1 ventilation followed by compressions.	Continue CPR in absence of spontaneous pulse/respirations.	33	☐

*If ventilations are unsuccessful, reopen airway and reattempt ventilations.

INSTRUCTOR _____ PASS _____

PERFORMANCE SHEET FOR COMPLETE OBSTRUCTION CONSCIOUS CHOKING INFANT

1	Rescuer checks for airway obstruction (2 to 3 sec.)	Rescuer must identify complete obstruction by looking, listening and feeling for ventilation and by observing lips for blueness. Foreign body assumed.	27 28 30	☐
2	4 Back Blows (3-5 sec.)	Support head and neck with hand. The infant is straddled over the rescuer's arm with the head lower than the trunk. The 4 back blows are delivered rapidly and forcefully between the shoulder blades. Each blow is intended to relieve the obstruction.	31	☐
3	4 Chest Thrusts (3-5 sec.)	The infant is sandwiched between 2 hands with head supported and is turned onto the back, and the thrusts are delivered in the midsternal region in the same manner as external chest compression. The head is lower than the trunk.	31	☐
4	Repeat steps 2 and 3 until successful	Repeat blows and thrusts until successful or until the infant becomes unconscious.	30	☐

INSTRUCTOR _____ PASS _____

PERFORMANCE SHEET COMPLETE AIRWAY OBSTRUCTION VICTIM FOUND UNCONSCIOUS

SKILL STEPS	ACTIVITY AND TIME (Seconds)	CRITICAL PERFORMANCE	REF. PG.	PASS
1	Establish unresponsiveness and call out for help. Allow 4-10 sec. if face down and turning is required.	Tap, gently shake shoulder, shout, "Are you OK?" Call out, "Help!" Turn if necessary supporting head and neck. Victim on hard surface. Adequate time for assessment.	12 13	☐
2	Open airway. Establish breathlessness. (Look, listen, and feel (3-5 sec.)	Kneels properly. Use head tilt with neck lift or chin lift to open airway. Ear over mouth, observe chest, look, listen and feel for breathing.	13 15	☐
3	Attempt to ventilate (3-5 sec.)	Attempt ventilation. Air is needed. No chest rise observed. Airway completely obstructed.	16	☐
4	Reattempt ventilation (3-5 sec.)	Reposition the head to assure a properly opened airway. Ventilate. No chest rise, Obstruction confirmed, foreign body assumed.		☐
5	Activate EMS System (2 sec.)	If a second rescuer is present he should activate the EMS System. Know local EMS number.	17 19 20	☐
6	4 Back Blows** (4-6 sec.)	Roll victim toward you, using your thigh for support. Give 4 forceful and rapidly delivered blows to the back between shoulder blades. Each blow or manual thrust is intended to relieve the obstruction.	17	☐
	4 Abdominal thrusts (5-6 sec.)	Position yourself with your knees close to victim's hips. Place heel of one hand in the midline between the waist and rib cage with second hand on top. Press into abdomen with quick inward & upward thrusts. This maneuver may be done astride victim.		☐
7	OR			
	4 Chest Thrusts (5-6 sec.)	Same position as for applying closed chest compression. Exert quick downward thrusts.	18	
8	Check for foreign body using finger sweep* (6-8 sec.)	Turn head up, open mouth with jaw lift technique and sweep deeply into mouth with hooked finger. May need to remove dentures.	18	☐
9	Attempt to ventilate. (3-5 sec.)	Use head tilt with neck lift or chin lift to open airway. Attempt ventilation. No chest rise. Airway remains obstructed.	19	☐
10	Repeat steps 6-9 until successful	Alternate above maneuvers in rapid sequence until obstruction is relieved. After successful ventilations, check pulse.	19	☐

INSTRUCTOR _____ PASS _____

*Simulate.

**The sequence of back blows followed by manual thrusts is preferred, the reverse sequence of manual thrusts followed by back blows is accepted. The two maneuvers together are more effective than either technique used alone. 34

Do not perform actual back blows or manual thrusts in practice.

PERFORMANCE SHEET COMPLETE AIRWAY OBSTRUCTION
PART I CONSCIOUS VICTIM, SITTING OR STANDING

SKILL STEPS	ACTIVITY AND TIME (Seconds)	CRITICAL PERFORMANCE	REF. PG.	PASS
1	Rescuer asks, "Can you speak?" (2-3 sec.)	Rescuer must identify complete airway obstruction by asking victim if he is able to speak. No action is taken if victim can speak or cough effectively. Foreign body assumed.	27 | 28	☐
2	4 Back Blows** (3-5 sec.)	Deliver 4 sharp blows rapidly and forcefully to the back between the shoulder blades; support the victim's chest with other hand. Each blow or manual thrust is intended to relieve the obstruction.	28 | 29	☐
	4 Abdominal Thrusts (4-5 sec.)	Stand behind victim and wrap your arms around his waist. Grasp one fist with other hand and place thumb side of your fist in the midline between the waist and rib cage. Press fist into abdomen with quick inward and upward thrusts.	29	
3	OR 4 Chest Thrusts	Stand behind victim and place your arms under victim's armpits to encircle the chest. Grasp one fist with other hand and place thumb side of fist on breastbone. Press with quick backward thrusts.		☐
4	Repeat steps 2-3 until successful	Alternate the blows and thrusts in rapid sequence until successful or until the victim becomes unconscious.	29	☐

If the obstruction is not relieved and victim becomes unconscious, ease him to the floor.

COMPLETE AIRWAY OBSTRUCTION
PART II VICTIM WHO BECOMES UNCONSCIOUS
(OPTIONAL TESTING SEQUENCE)

1	Position the victim and call for help. Allow 4-10 sec. if face down and turning is required.	Turn victim if necessary, supporting head and neck. Call out for help. Adequate time.	29 12 13	☐
2	Open airway and attempt to ventilate. (3-5 sec.) (Repositioning of the head and a second attempt to ventilate is optional and acceptable.)	Kneel properly. Use head tilt with neck lift or chin lift to open airway. Attempt ventilation. Air is needed. No chest rise observed. Airway remains obstructed.	14 29	☐
3	Activate EMS System (2 sec.)	If a 2nd rescuer is present, he should activate the EMS System. Know local EMS number.	19 | 20	☐

The procedure used to relieve the obstruction is the same as that used for the obstructed airway victim who was found unconscious, steps 6-9 on the proceeding page.

4	4 Back Blows**	For performance details, see page 46, skill steps 6-9 Obstructed Airway Unconscious	17	☐
5	4 Abdominal OR Chest Thrusts		|	☐
6	Check for foreign body using finger sweep*		|	☐
7	Attempt to ventilate		19	☐
8	Repeat sequence (steps 6-9) until successful.	Alternate maneuvers in rapid sequence until obstruction is relieved. After successful ventilations, check pulse.	19	☐

INSTRUCTOR _____ PASS _____

PERFORMANCE SHEET FOR INFANT OBSTRUCTED AIRWAY
CHOKING INFANT WHO BECOMES UNCONSCIOUS OR IS FOUND UNCONSCIOUS

SKILL STEPS	ACTIVITY AND TIME (Seconds)	CRITICAL PERFORMANCE	REF. PG.	PASS
1	Establish unresponsiveness. Call for help. Turn victim. (4-10 sec.)	Gently shake, tap, call out for help. Turn infant horizontal and face up while supporting head and neck.	29 30 12	☐
2	Open airway. Establish breathlessness. (Look, listen, and feel) (3-5 sec.)	Tip head back slightly, do not hyperextend. Rescuer looks toward chest with ear over mouth to look, listen and feel for breathing. Utilize head tilt-neck lift or head tilt-chin-lift.	30 31 15	☐
3	Attempt to ventilate. (3-5 sec.)	Ventilate - Air is needed. No chest rise observed. Airway obstructed.	32	☐
4	Reattempt to ventilate. (3-5 sec.)	Reposition the head to assure a properly opened airway. Ventilate. No chest rise. Obstruction confirmed, foreign body assumed.	32 17	☐
5	Activate EMS system (2 sec.)	If a second rescuer is present, he should activate the EMS system. Know local EMS number.	19 20	☐
6	4 Back Blows (3-5 sec.)	Support head and neck with hand. The infant is straddled over the rescuer's arm with the head lower than the trunk. The 4 back blows are delivered rapidly and forcefully between the shoulder blades. Each blow is intended to relieve the obstruction.	31	☐
7	4 Chest Thrusts (3-5 sec.)	The infant is sandwiched between 2 hands with head supported and is turned onto the back. The thrusts are delivered in the midsternal region in the same manner as external chest compressions. The head is lower than the trunk.	31	☐
8	Tongue-Jaw Lift (6-8 sec.)	Thumb in victim's mouth over tongue. Lift tongue and jaw forward with fingers wrapped around lower jaw. *Sweep only if foreign body is visualized.*	18 31	☐
9	Attempt to ventilate (3-5 sec.)	Open airway. Ventilate. No chest rise. Airway remains obstructed.	19 32	☐
10	Repeat steps 6-9 until successful.	Alternate above maneuvers until obstruction is relieved. After successful ventilations, check pulse.	32	☐

INSTRUCTOR _____ PASS _____

Note: Reference page numbers for rationale and review of skill steps are provided on the right edge of each performance sheet.

CPR READY REFERENCE

	ADULTS	CHILDREN	INFANTS
RESCUE BREATHING, VICTIM HAS A PULSE GIVE 1 BREATH EVERY	5 Seconds	4 Seconds	3 Seconds
NO PULSE-LOCATE COMPRESSION LANDMARK	Trace Ribs Into Notch, One Finger on Sternum	Same as Adult	Mid Sternum, Midway Between Nipples
COMPRESSIONS ARE PERFORMED WITH	2 Hands Stacked; Heel of One Hand on Sternum	Heel of One Hand	2 or 3 Fingers
NUMBER COMPRESSIONS PER MINUTE	60	80	100
COMPRESSION DEPTH	1½-2"	1-1½"	½-1"
RATIO COMPRESSIONS TO BREATHS—1 RESCUER	15:2	5:1	5:1
2 RESCUERS	5:1	5:1	5:1

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APPENDIX H

1. Before beginning rescue breathing and chest compressions, you must

   a. Find out the cause of the victim's collapse
   b. Obtain permission from the victim's family
   c. Check for medication information in victim's wallet or on a bracelet or necklace
   d. Be sure victim is breathless and pulseless

2. If slight gastric distension occurs in a victim as a result of artifical ventilation, the rescuer should

   a. Apply manual pressure over the victim's upper abdomen to relieve the pressure
   b. Keep the victim's head and shoulders higher than the chest
   c. Reposition the airway and breathe only enough to get a normal chest rise without attempting to expel the air from the stomach
   d. Keep the victim's head and shoulders lower than the chest

3. The most common cause of airway obstruction in an unconscious victim is

   a. Food
   b. Mucous
   c. Dentures
   d. Tongue

4. If a victim is coughing and wheezing from a partial foreign body obstruction in the airway, a potential rescuer should

   a. Give four back blows and four manual thrusts
   b. Give only back blows
   c. Give back blows and something to drink
   d. Not interfere

5. Which of these can cause failure to ventilate the victim's lungs adequately

   a. Excessive air in the stomach
   b. Inadequate head tilt
   c. Lack of an airtight seal
   d. All of the above

6. The most reliable indicator of effective rescue breathing is

   a. The patient loses much of his blue color
   b. You can see the victim's chest rise and fall
   c. When you blow into the victim's mouth, air enters easily
   d. The pupils of the eye become constricted

7. Complications which may result from chest compressions even when properly performed include

   a. Punctured lungs
   b. Laceration of the liver
   c. Fractured ribs and sternum
   d. All of the above

8. The universal distress signal characterizing an apparent obstructed airway in the conscious adult is

   a. Rapid heavy breathing
   b. Violent choking
   c. Victim's hand at his throat
   d. Violent thrashing of the arms

9. In order to provide CPR for a pulseless adult victim (given two rescuers), do not

   a. Compress sternum 1½ to 2 inches
   b. Give one breath after every five compressions
   c. Perform 60 compressions each minute at rate of one/second
   d. Pause briefly after every fifth compression to allow for one breath

10. The incidence of gastric distension can be minimized by

   a. Ventilating at a slower rate
   b. Pressing hard to seal the mouth better
   c. Decreasing the nose pinch to allow some air to escape
   d. Properly opening the airway and limiting ventilation volume to the amount which causes a normal chest rise

11. If, after 10 seconds, the rescuer cannot detect a carotid pulse in an unconscious adult victim, he should

   a. Begin rescue breathing
   b. Activate the EMS system and begin external chest compressions
   c. Deliver 4 back blows and 4 manual thrusts
   d. Check the femoral pulse

12. One circumstance under which a non-physician may discontinue CPR is

   a. When the rescuer thinks the victim will not survive
   b. When the rescuer suspects the victim will suffer permanent brain damage
   c. When the rescuer is exhausted and unable to continue
   d. When the rescuer sees no reaction of the pupils or other sign of life

13. In performing CPR the chest of the infant should be compressed

   a. ½ to 1 inch
   b. 1 to 1½ inches
   c. 1½ to 2 inches
   d. 2 to 2½ inches

14. The proper rate of rescue breathing in an infant is

   a. 10 ventilations per minute
   b. 20 ventilations per minute
   c. 30 ventilations per minute
   d. 40 ventilations per minute

15. When the rescuer is alone with a cardiac arrest victim and there is no possibility of someone else arriving at the scene the rescuer should

   a. Telephone for help before starting CPR
   b. Do nothing and wait for help to arrive
   c. Open the victim's airway then telephone for help
   d. Perform CPR for one minute then telephone for help

16. Recongition signs of a partial airway obstruction with poor air exchange in a small child are the child is unable to speak or cry and he may

    a. Immediately sustain cardiac arrest
    b. Produce a high pitched crowing like noise while breathing
    c. Show heavy rapid breathing

17. Keeping the heel of the hand lightly in contact with the chest during the relaxation phase of chest compression is important because

    a. Over-expansion of the chest is avoided
    b. Correct hand position can be maintained
    c. Stomach distension can be prevented
    d. The heartbeat can be felt

18. When one rescuer performs CPR on an adult victim, the recommended rate for cardiac compressions is

    a. A little faster than one compression per second
    b. A little slower than one compression per second
    c. Exactly one compression per second
    d. Fifteen compressions per minute

19. CPR is most effective when it is started immediately after an arrest, however there is a good chance of the victim being returned to his pre-arrest level of brain function if CPR is started in the first _____ minutes.

    a. 4-6
    b. 6-10
    c. 8-10
    d. 10-12

20. Since successful resuscitation of drowning victims has been reported after prolonged periods of submersion in cold water,

    a. Leave drowning victims in the water for as long as possible
    b. Initiate CPR even if the victim has been submerged for 20-30 minutes or more
    c. Delay CPR because of the hypothermia effect
    d. Use the back pressure-arm lift method of resuscitation

21. During one-rescuer CPR, how often should a rescuer palpate the carotid pulse to check for return of a spontaneous effective heartbeat

    a. After the first minute of CPR and every few minutes thereafter
    b. After the first five minutes of CPR and every five minutes thereafter
    c. Every ten minutes
    d. Every fifteen minutes

22. Which of the following is the best indication to let a rescuer know that his external chest compressions are producing adequate blood flow

    a. Change in patient's color
    b. Constriction of pupils
    c. A second person feels a pulse in the carotid artery with each compression
    d. There is no way to determine this without special instruments

23. During external chest compression, if the rescuer's hands are placed too low on the sternum the

a. Collarbone may be fractured
b. Lungs may be lacerated
c. Liver may be lacerated
d. Heart may be bruised

24. When switching places during two-rescuer CPR, the pulse check is performed by the

a. Rescuer at the head before moving to the chest
b. Rescuer at the head after moving to the chest
c. Rescuer at the chest after moving to give ventilations, but before ventilating
d. Rescuer at the chest after beginning ventilations

25. Which of these persons is likely to be a victim of airway obstruction?

a. A stroke victim
b. A person suffering drug intoxication
c. A person with something in his windpipe
d. All of the above

26. All of the following are risk factors of a heart attack except

a. Cigarette smoking
b. High blood fat-cholesterol level
c. High blood pressure
d. Nausea and vomiting

27. When opening the airway of an infant, do not exaggerate the head tilt because

a. It permits the accumulation of mucous and saliva
b. It may obstruct the breathing passages
c. It prevents an airtight seal
d. It causes the tongue to lodge in the back of the throat

28. The rescuer should palpate the infant's pulse by

a. Feeling for the carotid pulse in the neck
b. Feeling for the brachial pulse in the arm
c. Feeling for the radial pulse in the wrist
d. Feeling for the femoral pulse in the groin

29. How much time may be taken initially to make sure the individual does not have a pulse

a. Five seconds
b. Ten seconds
c. Fifteen seconds
d. Twenty seconds

30. The symptoms of a heart attack

a. May be mild and ignored, or attributed to some other cause
b. May occur suddenly without warning
c. May subside and return
d. May include all of the above

31. The proper rate of rescue breathing in the adult is

a. 4 times per minute
b. 12 times per minute
c. 20 times per minute
d. 28 times per minute

32. The ABC's of CPR stand for

a. Airway-Breathing-Cardiac Compression
b. Adjuncts-Breathing-Carotid Pulse
c. Airway-Breathing-Circulation
d. Airway-Back Blows-Chest Thrust

33. CPR should not be interrupted

a. For more than 1 second to check responsiveness
b. For more than 20 seconds for any reason
c. For more than 10 seconds with no exceptions
d. For more than 5 seconds except in certain circumstances

34. When performing external chest compression on an adult, the sternum should be depressed

a. ½ to 1 inch
b. 1 inch to 1½ inches
c. 1½ inches to 2 inches
d. 2 to 2½ inches

35. If a lone rescuer finds a non-breathing and pulseless victim lying face down at the scene of an auto accident, and the rescuer suspects that the victim has a back injury, what should the rescuer do

a. Turn the victim as a unit and begin CPR
b. Turn the victim's head to one side and begin CPR
c. Do nothing and wait until help arrives
d. Attempt to apply CPR with the victim in the face-down position

36. For a conscious victim with a complete airway obstruction, the rescuer should

a. Perform a finger probe to remove the obstruction and attempt to ventilate
b. Deliver 8 back blows and perform a finger probe
c. Deliver 4 back blows and perform a finger probe
d. Deliver 4 back blows and 4 manual thrusts until effective, or until the victim becomes unconscious

37. In mouth-to-mouth resuscitation the victim's dentures routinely should be

a. Removed because they contain bacteria
b. Left in (unless unusually loose) to facilitate making an airtight seal
c. Removed because they frequently obstruct the airway
d. Left in because it is illegal to remove them without the victim's consent

38. The greatest risk of death from a heart attack occurs within

a. The first two hours after onset of symptoms
b. Two to eight hours after onset of symptoms
c. Eight to twelve hours after onset of symptoms
d. Twelve to twenty-four hours after onset of symptoms

39. If vomiting occurs during a resuscitation effort, the best immediate procedure to follow is

a. Stop CPR until help arrives
b. Pause for a moment until the patient appears quiet again, then resume mouth-to-mouth ventilation
c. Switch to mouth-to-nose ventilation
d. Turn the victim's body to the side, sweep out the mouth and resume CPR

40. After opening the airway if a rescuer sees chest movement in an unconscious victim, he should

a. Not initiate any CPR procedure
b. Assume the victim is breathing
c. Listen and feel for breathing with ear near victim's mouth
d. Perform only chest compressions

41. Basic Life Support is that phase of emergency cardiac care that includes

a. Early recognition of a cardiac or respiratory emergency
b. Intervention to gain prompt entry into the emergency medical system
c. Application of rescue breathing and chest compressions, if the victim arrests
d. All of the above

42. Attempt back blows and manual thrusts to relieve a foreign body airway obstruction only in cases of

a. Total airway obstruction
b. Parial airway obstruction with poor air exchange
c. Either a or b
d. Partial airway obstruction with good air exchange

43. Using 4-10 seconds to establish unresponsiveness in collapsed victims is important because

a. The victim may have only fainted
b. It may prevent unnecessary resuscitation efforts
c. The person may just be asleep
d. All of the above are important reasons

44. Chest compression must always be accompanied by

a. Manual thrusts
b. Artifical ventilations
c. Relief of gastric distension
d. Administration of drugs

45. The correct way to roll the victim to deliver back blows is

a. Away from the rescuer onto his chest face down on the floor
b. Away from the rescuer onto his side
c. Toward the rescuer onto his side with his chest against the rescuer's legs

46. If a second rescuer determines that the first rescuer's chest compressions are not producing a carotic pulse

a. The first rescuer should be told to recheck his landmark and reevaluate his compression technique, as he continues CPR
b. The first rescuer should check the pulse himself
c. The second rescuer should insist on taking over
d. The first rescuer should ignore the second rescuer and continue CPR

47. One purpose of "Good Samaritan" legislation is

a. To require all medical professions be trained in CPR
b. Protect training instructions
c. To minimize possible legal consequences to the rescuer for providing CPR

48. External chest compression for a pulseless victim is too hazardous to perform

a. If the patient has numerous rib fractures
b. If neck injury is present
c. Following open heart surgery
d. None of the above

49. The number one cause of death in the United States is

a. Cancer
b. Accidents
c. Heart and blood vessel disease
d. Stress

50. When the rescuer palpates the pulse of the adult victim with one hand, the other hand of the rescuer should

a. Maintain the head tilt
b. Sweep out victim's mouth
c. Feel chest for movement
d. Find landmark for compressions

KEY - BLS TEST 1983

1. d JAMA p. 461
2. d JAMA p. 469, 470
3. b JAMA p. 472
4. b JAMA p. 462
5. c JAMA p. 463, 464, 467
6. b JAMA p. 467
7. c JAMA p. 470, 506
8. a JAMA p. 464, 466
9. b p. 469, 470
10. d p. 461
11. a p. 468
12. a p. 467
13. c p. 468
14. a p. 461
15. b p. 476
16. b p. 458
17. b p. 461
18. d AHA-BLS Manual Chap. 2
19. d AHA-BLS Manual Chap. 8
20. b JAMA p. 462
21. d JAMA p. 468, 469
22. c p. 467
23. a p. 458
24. d p. 461, 462
25. d p. 466
26. a JAMA p. 457, 459
27. c p. 462
28. b p. 476
29. d p. 468
30. a p. 467, 468
31. c JAMA p. 475
32. a JAMA p. 468
33. c p. 467
34. c JAMA p. 463
35. d JAMA p. 461, 463
36. a JAMA p. 476
37. c JAMA p. 468, 486
38. d JAMA p. 470, 506
39. b JAMA p. 476
40. c JAMA p. 461
41. b JAMA p. 462
42. d AHA-BLS Manual Chap. 8
43. d JAMA p. 506
44. d JAMA p. 464
45. d JAMA p. 507
46. b JAMA p. 464
47. c JAMA p. 468
48. c JAMA p. 467
49. b JAMA p. 468
50. d JAMA p. 464

APPENDIX I

LA CROSSE LUTHERAN HOSPITAL

1910 SOUTH AVENUE / LA CROSSE, WISCONSIN 54601-9980 / (608) 785-0530

December 5, 1985

Rich Miley

1411 Travis St.

La Crosse, WI.

Dear Rich,

I am pleased to learn of your interest in doing research in the Department of Education at Lutheran Hospital. I know it would not only benefit you in your program in Health Education but also give us some valuable research data to validate (or eliminate) some programming.

An area of interest for us is adult education in a self-learning mode. Our Cardiopulmomary Resuscitation classes for community participants have always been lecture and demonstration. We are now using both that traditional course and a self-paced course of study. We would like to know the knowledge and psychomotor skill retention of the students with each method of instruction.

If this interests you as well, contact Laura Wiedman, R.N., a member of the staff, and a instructor-trainer in CPR. I'm sure she will welcome your time and commitment to such a study.

Sincerely,

Dorothy Wetterlin

Dorothy Wetterlin, Acting Director

Department of Education

LaCrosse Lutheran Hospital

DW:jmh

APPENDIX J

January 27, 1986.

Richard P. Miley
Dept. Of Education
Lutheran Hospital
1910 South Avenue
LaCrosse, Wisconsin
54601

Mr. Robert Walker
Community Educational Coordinator
Springdale Memorial Hospital
Springdale, Arkansas

Dear Mr. Walker,

Dr. Gary Gilmore has shared with me a copy of your August 1981 Thesis, Retention Of One-Rescuer CPR Psychomotor Performance And Basic Life Support Program Skills. My area of interest is the Impact On Retention Of Basic Cardiac Life Support: The Effect Of Two Teaching Methods For The Lay Community. The teaching methods studied will be the lecture-demonstration-return demonstration method and a self-paced, self-learning (5module) method. The study will be conducted with the help of the Department Of Education at LaCrosse Lutheran Hospital.

My reason for contacting you is to ask for your support and any follow up study or reference material you would like to share.

Thank you for your interest and concern.

Sincerely yours,

Richard P. Miley

Copy to Dr. Gary Gilmore

APPENDIX K

PARTNER VERIFICATION SHEETS

The following sheets are to be used to practice your CPR skills. These sheets will prepare you for doing the skills demonstrations with an instructor/proctor.

The sheets are divided into 4 modules (sections)

Module B: Obstructed Airway Protocols - Adult
Module C: 1 & 2 Rescuer CPR
Module D: Obstructed Airway Protocols - Infant
Module E: Infant Resuscitation

Instructions for use:

1. Work with a partner.

2. Practice the skills for each module until you feel you are proficient.

3. Have your partner observe your performance and check off your skills.

NOTE: You must be able to demonstrate the proper sequence of skills for each module without prompting or using the sheets

4. Once your partner has verified your ability to perform the skills, request that the instructor/proctor observe your skills demonstration(s).

5. You may perform the skills demonstration with the instructor when you are proficient in <u>each</u> module or <u>all</u> modules.

If an instructor/proctor is not available when you are ready to do the skills demonstration, begin practicing another module. The Instructor/Proctor will observe you when available.

4/85
mcj
Dept. of Ed.

COMPLETE AIRWAY OBSTRUCTION

Adult Conscious Victim

STEPS	ACTIVITY	PART.	INST.
1.	RESCUER ASKS: "CAN YOU SPEAK"		
	must identify complete airway obstr.		
2.	DELIVERS 4 BACK BLOWS		
	4 sharp blows between shoulder blades on spine - support the victim with other hand/arm		
3.	DELIVERS 4 ABDOMINAL THRUSTS		
	stands behind victim		
	finds landmarks		
	places thumb side of fist midline between waist and ribcage - presses inward and upward		
4.	REPEAT STEPS 2 & 3 UNTIL SUCCESSFUL		

B

COMPLETE AIRWAY OBSTRUCTION

Adult Victim Who Becomes Unconscious

STEPS	ACTIVITY	PART.	INST.
1.	POSITION VICTIM SUPINE		
2.	CALL OUT FOR HELP		
3.	OPEN AIRWAY		
	head tilt chin lift/ or head tilt neck lift		
4.	ATTEMPT TO VENTILATE		
	(airway still obstructed)		
	(RESPOSITION AIRWAY and second attempt to ventilate is optional		
5.	ACTIVATE THE EMS		
	call out number		
6.	DELIVER 4 BACK BLOWS		
	roll victim toward rescuer, support the neck forceful blows between shoulders		
7.	DELIVER 4 ABDOMINAL THRUSTS		
	roll victim on to back, heel of hand midline between waist and ribcage, keep hand pointed toward head of victim		
8.	SWEEP THE MOUTH		
	open mouth using jaw lift method		
9.	ATTEMPT TO VENTILATE		
	(airway still obstructed)		
10.	REPEAT STEPS 6-9 UNTIL SUCCESSFUL		

COMPLETE AIRWAY OBSTRUCTION

Adult Unconscious Victim

STEPS	ACTIVITY	PART.	INST.
1.	ESTABLISH UNRESPONSIVENESS		
2.	CALL OUT FOR HELP		
3.	OPEN THE AIRWAY		
	utilize head tilt-chin lift or head tilt-neck lift		
4.	ESTABLISH BREATHLESSNESS		
	look, listen and feel (5 sec.)		
5.	ATTEMPT TO VENTILATE (airway obstructed)		
6.	REPOSITION AIRWAY AND ATTEMPT TO VENTILATE		
	adjust airway (airway obstructed)		
7.	ACTIVATE THE EMS		
	call out the number		
8.	DELIVER 4 BACK BLOWS		
	roll victim toward rescuer support the neck deliver blows between shoulders		
9.	DELIVER 4 ABDOMINAL THRUSTS		
	roll victim on to back place heel of hand midline between waist and ribcage keep hands pointed toward head of victim		
10.	SWEEP THE MOUTH		
	open mouth using jaw lift method		
11.	ATTEMPT TO VENTILATE (airway obstructed)		
12.	REPEAT STEPS 8-11 UNTIL SUCCESSFUL		

ADULT CARDIOPULMONARY RESUSCITATION

One and Two Rescuer

STEPS	ACTIVITY	PARTNER	INSTR.
1.	ESTABLISH UNRESPONSIVENESS		
2.	CALL OUT FOR HELP		
3.	OPEN THE AIRWAY		
	head tilt-chin lift		
	head tilt-neck lift		
4.	ESTABLISH BREATHLESSNESS LOOK, LISTEN, FEEL (5 Sec.)		
5.	GIVE 4 VENTILATIONS		
6.	ESTABLISH PULSELESSNESS 5-10 sec. (adequate time)		
	palpate carotid on side nearest resucer		
7.	ACTIVATE THE EMS Calls out number		
8.	4 CYCLES: 15 COMPRESSIONS AND 2 VENTILATIONS proper body position		
	check land marks each time		
	correct hand position		
	vertical compressions		
	counts out loud		
	proper rate and ratio		
	adequate ventilations		
9.	PERFORMS ONE MINUTE PULSE CHECK		
	check pulse and breathing (5 sec.)		

STEPS	ACTIVITY	PARTNER	INSTR.
10.	RESUMES CPR WITH 2 VENTILATIONS AND 15 COMPRESSIONS		
11.	2ND RESCUER JOINS states: I"m certified in CPR, I'LL HELP"		
	checks carotid pulse for adequate compressions (5 sec.)		
12.	2ND RESCUER STATES: "STOP CPR"		
	checks for spontaneous pulse and breathing (5sec.)		
13.	2ND RESCUER STATES: "NO PULSE, I'LL BREATHE		
	Gives 1 adequate breath		
14.	2ND RESCUER STATES: "CONTINUE CPR"		
	1st rescuer starts compressions at 2 rescuer rate and ratio 5:1		
	counts out loud 1:1000 2:1000		
15.	COMPRESSOR CALLS FOR SWITCH		
	call stated clear and within count		
16.	SIMULTANEOUS SWITCH Gives breath after 5th compression		
rescuer at head	locates hand position for compressions		
rescuer at chest	completes 5th compress. moves to head		
	5 sec pulse check		
	ventilates once		
	states continue CPR		

D

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COMPLETE AIRWAY OBSTRUCTION
Infant Conscious Victim

STEPS	ACTIVITY	P	I
1.	ESTABLISH COMPLETE AIRWAY OBSTRUCTION		
	look, listen and feel		
2.	DELIVER 4 BACK BLOWS		
	support infant's head		
	keep head lower than trunk		
3.	DELIVER 4 CHEST THRUSTS		
	support head, turn on back		
	keep head lower than trunk		
	thrusts delivered on mid sternum on nipple line		
4.	REPEAT STEPS 2 & 3 UNTIL SUCCESSFUL		

COMPLETE AIRWAY OBSTRUCTION
Infant Unconscious Victim

STEPS	ACTIVITY	P	I
1.	ESTABLISH UNRESPONSIVENESS		
2.	CALL OUT FOR HELP		
3.	OPEN THE AIRWAY		
	tip head back, do not hyperextend		
4.	ESTABLISH BREATHLESSNESS		
	look, listen and feel (5sec)		
5.	ATTEMPT TO VENTILATE		
	(airway obstructed)		
6.	REPOSITION AIRWAY AND ATTEMPT TO VENTILATE		
7.	ACTIVATE THE EMS		
	call out the number		
8.	DELIVER 4 BACK BLOWS		
	support head, turn face down, keeping head down		
9.	DELIVER 4 CHEST THRUSTS		
	support the head, turn onto back, keep head down		
	thrust midsternal region between nipples		
10.	CHECK MOUTH FOR FOREIGN OBJECT		
	sweep only if object is visualized		
11.	ATTEMPT TO VENTILATE (airway remains obstructed)		
12.	REPEAT STEPS 8-11 UNTIL SUCCESSFUL		

E

INFANT CPR

STEPS	ACTIVITY	P	I
1.	ESTABLISH UNRESPONSIVENESS		
2.	CALL OUT FOR HELP		
3.	OPEN THE AIRWAY		
	tip head back, do not hyperextend		
4.	ESTABLISH BREATHLESSNESS		
	look, listen, feel (5 sec)		
5.	GIVE 4 VENTILATIONS		
	cover mouth and nose		
	see chest rise		
6.	ESTABLISH PULSELESSNESS		
	palpate brachial pulse 5-10 sec.		
7.	ACTIVATE EMS		
	call out numbers		
8.	10 CYCLES OF 5 COMPRESSIONS AND 1 BREATH		
	rescuer's hand on forehead placed under infant's spine		
	locate proper position for compressions proper rate and ratio (5:1) adequate ventilation		
9.	PERFORM PULSE CHECK		
	checks pulse and breathing (5 sec)		
10.	RESUMES CPR WITH 1 BREATH AND 5 COMPRESSIONS		