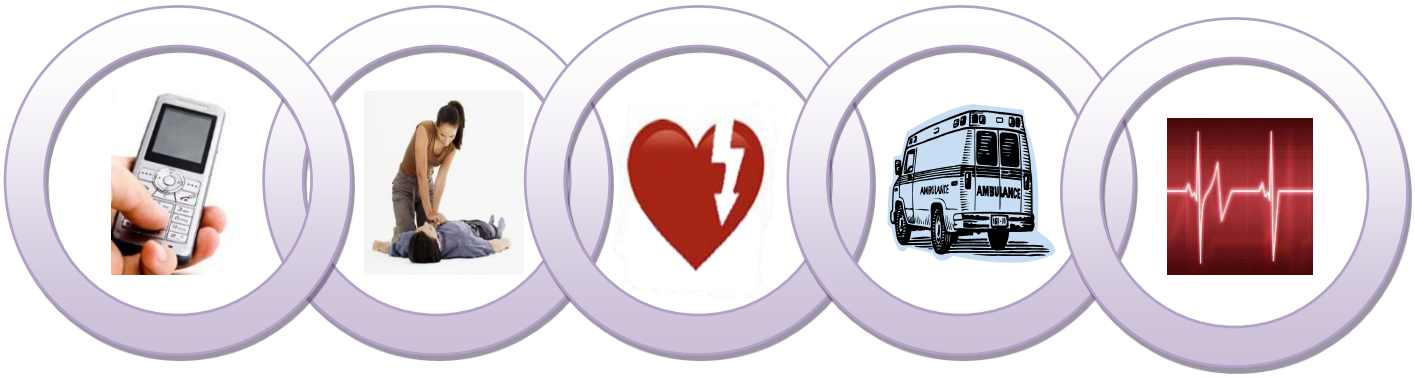
Restricted, Non Sensitive

National Heart Centre Singapore
SingHealth

BCLS+AED INSTRUCTOR TRAINING COURSE



Handbook

Time (hour)	Topics	Session Leader
0800 - 0830	Welcome to NHCS Training	Chief Instructor
0830 - 0900	Course Introduction	Chief instructor
0900 - 0945	Principles of Teaching and Learning	Chief Instructor
0945 to 1000	**Tea Break**	
1000 to 1100	Principles of Evaluation - Graph Interpretation - Assessment Criteria	Chief Instructor
1100 - 1230	Demonstration of • BCLS & AED Modules • Manikin Maintenance • Graph Interpretation	Instructors
1230 - 1330	**Lunch**	
1330 to 1400	Theory Test	Chief Instructor
1400 to 1515	Practice - Presentation of Assigned Module *(5 mins per participant)* - Interpretation of one-man CPR recording Strip - Steps for Manikin Maintenance	Instructors
1515 to 1530	**Tea Break**	
1530 to 1630	Practical Assessment - Presentation of Assigned Module *(5 mins per participant)* - Interpretation of one-man CPR recording Strip - Steps for Manikin Maintenance	Instructors
1630 - 1700	Result Debrief and Evaluation	Chief Instructor

COURSE INTRODUCTION

This course is planned to make a good instructor of anyone who wish to teach the skills of BCLS+AED. The prospective instructor should not just understand how to use the AED or how to do basic life support, but the need to teach these skills well for best effect. At the end of this course, we need to have a confident instructor.

Pre-requisites for attending a BCLS+AED Instructor Training Course

To participate in BCLS+AED Instructors' Course, the candidate must have the following pre-requisites:

1. Possess a valid SRFAC accredited BCLS+AED Provider certificate.
2. Read through the Instructors' Training manual.
3. Understand the objectives of the Singapore Resuscitation and First Aid Council (SRFAC) and the need for instructing in such a program.

Objectives of BCLS+AED Instructors' Course

By the end of this course the trainee-instructor should be able to:

1. Exhibit the characteristics required of SRFAC accredited instructor and be a role model in provision of the skill.
2. Plan, organize and conduct the BCLS+AED theory and practical training and assessment in accordance with SRFAC guidelines.
3. Ensure the safety and well-being of learners (Trainee-Providers).
4. Monitor participants' practice and provide corrective feedback and encouragement that is consistent with the standards of performance expected.
5. Recognize that the theory and practical assessments are to test the provider's understanding of the key steps in the skill and ability to carry out the skills in accordance with the standards laid down by SRFAC.

Certification as a BCLS+AED Instructor

Participant in BCLS+AED Instructors' Course does not automatically qualify a person to be an instructor. To be certified as an instructor, candidates must:

1. Successfully complete the pre-requisites course requirements.
2. Attend and actively participate in all portions of the Instructors' Course.
3. Score at least 80% on the theory test.
4. Upon successful completion of the BCLS+AED Instructor Course, trainees:
   a) are required to conduct two practice-teaching assignments at any SRFAC accredited BCLS+AED Training program under the supervision of SRFAC accredited BCLS+AED Chief Instructor **within 6 months** before being certified to be qualified BCLS+AED Instructor.

b) BCLS+AED Instructor Certificate will be issued upon successful completion of the two supervised teaching assessments. The trainee instructor has to submit / fax the Trainee Assessment Form to:

Ms. Nazeera Binte Hamzah
Senior Associate Executive
Nursing Development Unit
National Heart Centre Singapore
5 Hospital Drive, Singapore 169609
Tel: 67042151 / Fax 68449058

The SAMPLE format of these two supervised assessment form is attached at the end of this manual.

Certificate Issue and Validity Period

BCLS+AED Instructor Certificate can be issued by any SRFAC accredited training centre upon the applicant demonstrating proof of having successfully attended the SRFAC accredited BCLS+AED Instructors' Course and successfully completed two supervised practice-teaching assignment, within **six months** at any SRFAC accredited BCLS+AED Instructor Training Centre.

The validity period of the certificate is two (2) years.

A certified instructor should instruct at least two BCLS+AED provider courses per year for 2 years at any SRFAC accredited BCLS+AED Training Centre to be able to retain status as an Instructor.

If lapsed within 12 months from expiry – to fulfil 2 BCLS+AED instructor attachments within 12 months from expiry (does not count towards yearly quota) New validity will start from the date of last attachment.

If lapsed more than 12 months from expiry – restart the instructor course. BCLS+AED Certificate renewal is issued by Training Centre.

Desired characteristics of trained CPR+AED Instructors

While the obvious aim is to produce instructors in the combined skills of BCLS and AED use, the persons trained have to:

1. Demonstrate the ability to facilitate the learning of good quality CPR. This must be through the use of good communication skills on the part of the instructor and the use of the instructor as a facilitator of learning.
2. Understand the need for performance of good quality CPR and the characteristics of what constitutes good quality of this life saving technique.
3. Be comfortable with integrating the skills of CPR and AED use and also in teaching these to a third person.
4. Obtain a keen understanding, and be supportive of the efforts, of SRFAC in trying to promote training in the skills of BCLS and AED amongst a wide segment of society.

Duties of Instructors and Chief Instructors:

a. It is preferred that all instructors be accredited under a national program. In Singapore, the accreditation system is overseen by the SRFAC.
b. Instructors and Chief Instructors should arrive at the training centre about 30 minutes before the start of the course. On arrival, the venue needs to be set up and training manikins and training aids prepared.
c. The Chief Instructors needs to ensure that all manikins are functional and that there are adequate numbers of manikin accessories, such as lungs, face shields and cleaning aids and adequate sets of theory and practical test sheets.
d. The Chief Instructor also runs through the course program with the instructors to address and emphasis the areas of standardization.
e. The Training Centre ensures that the instructors document their attendance in the centre records and in their own handbook.
f. Any special roles for the individual instructor will be designated by the Chief Instructor prior to the start of the course.
g. The Chief Instructor is not assigned to any skills station. He should be able to oversee teaching being carried out at each station and provide positive strokes at any one or more stations to enhance the teaching given by the various instructors.

Performance Criteria to be used by Instructors at BCLS+AED Provider Course

a. For BCLS portion, the instructor, if using an electronic manikin with a skill meter (such as the Resusci Anne), must ensure that:

   i) At least 80% of chest compressions and at least 50% of ventilations are adequate.
   ii) The chest compression rate should be at 100 to 120 per minute
   iii) The student is counting the compressions loudly.
   iv) A total of five cycles of 30:2 CPR should be completed within 130 seconds
   v) Chest compressions are at 4 to 6 cm depth with full chest recoil.
   vi) Adequate ventilations refer to tidal volume of 400 to 600 ml.

b. For the AED portion, of the BCLS+AED course, the instructor must strive to ensure that:

   i) Delays in chest compression while AED pads are being applied should not exceed five seconds.
   ii) Interruptions to chest compressions while the AED is analyzing the heart rhythm should not exceed 10 seconds.
   iii) Interruptions to chest compression while the AED is delivering a shock should not exceed 5 seconds.
   iv) That the student continues to provide chest compressions at a rate of 100 to 120 per minute and compression: ventilation ratio of 30:2 in between all the above interruptions.

MODULE 1 : TEACHING AND LEARNING

1.1 INTRODUCTION

The Instructor course is designed to help the instructor with limited teaching experience understand the instructional process and to help the provider make the transition to instructor. The success of teaching depends on many factors, including, the objectives of the course, the resources available to the instructor, the characteristics of the participants, the learning environment and the instructor.

The primary objective of this course is to help the instructor develop skills in teaching and learning.

1.2 THE CONCEPT OF TEACHING AND LEARNING

Every person is a learner. Learning is an on-going and life long process. People learn within social and cultural contexts, independently and through interaction with others. What is learned depends on the way it is learned and with whom it is learned. The vital aspects of teaching include identifying the ways others learn best and extending the ways they learn, creating learning opportunities, and evaluating outcomes. Teaching is a planned experience that facilitates learning. Planned experiences that facilitate learning are the responsibility of the instructor and instructor trainer.

The teaching and learning concept applies to all the life support programme in that participants learn new skills as first responders in an emergency.

1.3 PRINCIPLES OF TEACHING AND LEARNING

Principles of effective learning and teaching provide the basis for on-going improvement of learning and teaching practices. To further promote effective learning and teaching, eight guiding principles have been formulated for the development and implementation of quality learning programs. These principles acknowledge the complex and dynamic nature of the learning-teaching process. They are based on the premise that to learn is to make meaning from experience.

Principle 1: Learning is continuous

It is important to begin at the learner's level of knowledge and to relate new learning information the learner needs.

Principles 2: Learning is purposeful and must make sense to the learner

Progress in learning must be constantly appraised through feedback. The purpose of learning the information and skills must be kept in sharp focus.

Principles 3: Learning involves as many senses as possible

The more stimulating a learning activity is to the senses, the longer the information will be retained. Conservative figures indicate that 75% of what is heard is forgotten after 2 days. It has been reported that learners remember

- 10% of what is said
- 20% of what is heard
- 30% of what is seen
- 50% of what is heard and seen
- 80% of what is heard, seen and done.

Principles 4: Learning activities must be appropriate for the situation

In learning all life support courses, the greatest proportion of class time should be spent in manikin practice, using performance sheets as a learning tool or guide.

Principles 5: Learning must be stimulating

Instructors can motivate learners by helping them achieve higher levels of proficiency and encouraging other levels of courses completion, such as instructor and instructor trainer. The performance expected of learners, however, should be suited to their interests and abilities.

Principles 6: Learning must result in functional understanding

Memorization alone is insufficient. It must be reinforced with practical application in specific situations. Repeated practice of memorized steps in a simulated situation will reinforce learning.

Principles 7: Learning is affected by emotions

The instructor should strive to elicit positive emotions, such as a sense of accomplishment and satisfaction in acquiring the skills. The instructor should also minimize unpleasant emotions, such as frustration and fear of failure during practice and evaluation, through positive and enthusiastic support of the learner. The intensity of feelings affects learning differently in different persons. Some may approach the training with little emotion; others may be reminded of unpleasant events and have difficulty. It may be useful for the instructor to discuss, formally or informally, the many potential feelings related to the specific training and the actual application of the skills in real situations.

Principles 8: Learning is affected by the physical and social environment

The physical environment should be conducive to both the kind of learning taking place and activities used for learning. Details such as the comfortable arrangement of tables and chairs and adequate space for practice enhance learning.

1.4 THREE DOMAINS OF LEARNING OBJECTIVES

Learning objectives should identify what the learner is to know or do, how well, and under what conditions. Learning objectives help to clarify expectations for performance. To teach properly, instructors must consider how learners may best achieve the objectives.

Learning objectives can be classified into three categories.

A. Cognitive

Tell what information the learner must know and describe how the knowledge will be demonstrated. It can be taught effectively in variety of ways. Instructors may give reading materials, hold lectures and discussions; and use films, videotapes, or other visual aids. Cognitive objectives require that information be given to learners. Thus, any method that streamlines delivery of information is acceptable. For most courses, didactic (teaching) session accomplish this goal.

B. Psychomotor

Tell what physical skills the learner must be able to perform. They are best learned (and most effectively taught) in practice sessions. The way to learn is to practice. Instructors must provide sufficient time in courses for practice. The ability of the participants to achieve psychomotor objectives is related to their agility, balance, flexibility rhythm, timing, endurance, strength, and kinesthetic sense. Most learners can master the psychomotor skills with proper instruction and adequate time.

C. Affective

They are the most difficult to teach. Perhaps the most important thing an instructor can do is being sensitive to learners' feelings, attitudes, and past experiences. A patient, confident, friendly, and empathetic instructor can help learners feel comfortable and confident. The instructor's attitude and behaviour should encourage the learners to want to learn. Impatience, aloofness, callousness, tactlessness, tastelessness, or negative characteristics may "turn off" learners, making learning difficult. The instructor is the strongest influence on learning during a course.

MODULE 2 : ADULTS AS LEARNER

Part of being an effective instructor involves understanding how adults learn best. Compared to children and teens, adults have special needs and requirements as learners. Malcolm Knowles' identified the following characteristics of adult learners:

2.1 CHARACTERISTICS OF ADULTS LEARNERS

- Adults are *autonomous* and *self-directed*

They need to be free to direct themselves. Instructor must actively involve adult participants in the learning process and serve as facilitators for them. Specifically, they must get participants' perspectives about what topics to cover and let them work on projects that reflect their interests. They should allow the participants to assume responsibility for presentation and group leadership. They have to be sure to act as facilitators, guiding participants to their own knowledge rather than supplying them with facts. Finally, they must show participants how the class will help them reach their goals (e.g. via a personal goals sheet).

- Adults have accumulated a foundation of *life experiences* and *knowledge.*

These life experiences include work-related activities, family responsibilities, and previous education. They need to connect learning to this knowledge/experience base. To help them do so, they should draw out participants' experience and knowledge which is relevant to the topic. They must relate theories and concepts to the participants and recognize the value of experience in learning.

- Adults are motivated to Learn

While adult learners may respond to external motivators, internal priorities are more important. Incentives such as increased job satisfaction, self-esteem and quality of life are important in giving adults a reason to learn. If any of these can be related as part of technology-based instruction adult s will respond more positively.

- Problem-based learning

According to Driscoll (1998), adults learn through problem-solving. They are motivated to learn as a response to the problems in their lives, thus organizing the content of training programs by problem area, rather than by broad subject would be more significant for them. For example, adults prefer a course on how to perform a specific skill rather than s general course on how to perform the skill.

2.2 NEEDS OF ADULT LEARNERS

For successful training, the instructor must recognize the learners' cognitive, psychomotor, and affective needs.

- **Cognitive needs**

Cognitive needs include the need for new information to make sense and be easy to understand. The instructor needs to include opportunities for clarification as part of the learning. Although written tests are most commonly used to measure this learning, many learners respond better to positive acknowledgement of correct answers and guidance about incorrect responses. This can be accomplished in class through the use of questions and voluntary answers. Adults also learn cognitive information when given practical problem to solve. All participants benefit when questions are asked through class discussion.

- **Psychomotor needs**

Learners also have needs related to learning psychomotor skills. Instructors should recognize that learners will initially demonstrate skills awkwardly and somewhat clumsily. This should be readily tolerated by the instructor, who should provide positive feedback and encouragement about skills well done and guidance about skills needing additional practice. Learners will more likely repeat performances that are positively reinforced.

Motor learning is a gradual process of development. Learners begin by attempting to explore and imitate the skill, and with practice they are able to perform with more prevision. Mastery of skills, i.e. the ability to perform a skill consistently without any error, is rarely achieved without continual practice. As learners proceed through the various levels of skill development, from rescuer to instructor to instructor trainer, the psychomotor skills become refined from basic motor skills to high-level skills and finally to near perfect motor skills.

Some participants may require a longer time than others to master skills but may retain skills longer because of additional practice. They may have high expectations of themselves. Instructors should be sensitive to these expectations. They may need to suggest rest periods or modification of methods to maximize learners' success. Some adults are embarrassed about declining physical abilities. Instructors can ease uncomfortable feelings through sensitive observation and recognition of problems. Learners need different amount of time to acquire the psychomotor skills.

While acquiring the skills, learners need a physical environment that will make learning as free from stress as possible. An ideal physical environment for psychomotor learning is a well-ventilated, well-lighted room with adequate space for each group of participants, instructor and manikin.

- **Affective needs**

Participants also have affective learning needs. The behaviors and attitudes of the instructor towards the learner can influence this area more than any technique, strategy, or instructional method. All learners want to be treated with dignity and respect. The instructor must protect the learners' self-esteem so that mistake can be made and corrected without diminishing the desire to learn. Some learners may have pride that will not allow them to make mistakes or feel foolish. The sensitive instructor will recognize this trait and present needed corrections positively, avoiding behavior that could be perceived as belittling the learner.

All learners bring values and beliefs to the classroom. These values may affect a participant's ability to learn, depending on the subject matter. Adult will accept or reject information depending on whether if fits with their value system. In addition, the reason the participant is taking the course may affect the ability to learn. Finally, learners, particularly adults, fear failure. This fear is directly proportional to a learner's past experiences. Most adults will admit to some anxiety about failure. These anxieties can be reduced through assurances by the instructor that for the layperson there is no pass or fail and that "we are willing to work with you and help you learn".

In summary: learners bring many needs to the courses they attended. These include a need for recognition of their motivation and past experience, a need to learn by doing and to receive feedback about progress, a need for comfortable, informal learning environment, a need to be accepted, and a need to be treated with dignity. Instructors sensitive to these needs will be more successful and derive greater satisfaction from their teaching.

Teaching Strategies

The instructors provide importance guidance and support to the learning process. Learning can be enhanced by the instructor who uses effective communication skills to help achieve the learning objectives.

1. Lecture is didactic teaching strategy which the instructor is the 'dispenser' of information.
2. In a group discussion, the instructor takes the role of initiator, facilitator and has minimal participation in the discussion. During the group discussion, the instructor initiates interaction amongst learners and it is an effective teaching strategy in soliciting a large amount of input from the learners.
3. Demonstration of skills is an effective teaching strategy in teaching BCLS. Position of the instructor is very important when performing, so as to enable learners to view the steps. The steps must be performed in the correct sequence so as not to confuse the learners.

MODULE 3 : PRINCIPLES OF EVALUATION

Evaluation teaches and measures the progress and effectiveness of the training program or activity. Evaluations are used to:

a. Determine extent to which training objectives have been met
b. Seek to improve the future planning and implementing of training
c. Provide insights for adjusting, reviewing and revising goals, schedule and procedures

According to Gronlund and Linn (1990), evaluation is a systematic process of determining the extent to which the objectives are archived. It is a continuous process based upon the criteria set and measures the performance of the learners, effectiveness of the instructors and the quality of the training. Therefore, evaluation of teaching must begin with clear and meaningful definition of the learning objectives. The Instructor must be familiar with the criteria for evaluation that is the requirement for theory and practical assessments.

Non-Verbal Behavior

Instructors should be aware of their non-verbal behavior and use it to enhance and reinforce what they say.

Verbal Behavior

Verbal behavior falls into 3 categories:

1. Giving information

   The instructor must demonstrate personal commitment in giving information to the learner.

2. Asking questions

   The instructor must be wary as to whether the question is closed-ended or open-ended and why it is important to ask questions.

3. Giving feedback

   When giving feedback to learners, the instructor should remember that the feedback should be:

   Timely - so that the learner is able to recognize the connection between the feedback statement and the recent performance

   Private - so that the learner should not feel embarrassed or ridiculed

   Direct - should be given to the person for whom it is intended

   Clear - the learner should know what the instructor wants to say

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Types of Evaluation

Evaluation is classified into 2 types:

- Formative Evaluation
- Summative Evaluation

Formative evaluation is intended to strengthen and improve the objective being evaluated. It is usually conducted informally throughout learning process. Thus, formative evaluation concentrates on ways of improving a project or a programme while it is on-going.

In contrast, summative evaluation is intended to examine the effects of outcomes of the object being evaluated. It is undertaken after the project or a programme has been completed.

Purpose of Evaluation

- To motivate the learner to learn.
- To assess the effectiveness of a project.
- To assess the outcomes of the project.
- To reinforce knowledge and skill emphasized in the course.

3.1 THE RELATION OF LEARNING OBJECTIVES TO EVALUATION

Course evaluation should focus on how effective this goal has been achieved and provide feedback to help correct deficiencies. Criteria for course completion must be identified and shared with learners. The goal of the courses should be to impart knowledge and foster learning.

Cognitive and skills evaluation sessions present a multitude of challenges to the instructor. There may be concerns about the need for evaluation or about the objectivity, reliability, validity or clinical usefulness of evaluation. Evaluation systems are often difficult to develop and use. Add to these concerns emotion-laden testing circumstances and learners' fear of failure or worry about embarrassment, and evaluation is fraught with difficulties.

If learning objectives are specified, many problems in evaluation may be resolved. The most effective method of measuring achievement of such psychomotor objective is to have the learner demonstrate it. Thus, at some time in a course, the evaluation of psychomotor skills will enable the learner to demonstrate achievement of those skills.

Cognitive objectives, on the other hand, may be demonstrated by asking a series of questions to see if the learner knows the information. This and other cognitive objectives may be measured by written questions.

3.2 GUIDELINES AND CRITERIA FOR EVALUATION

Manikin practice and evaluation are essential. During testing, the instructor should evaluate the learner safe and effective management of the casualty.

To satisfactorily complete the course, the learner must perform skills according to the SRFAC guidelines incorporated into the performance, or scoring sheets and satisfies the specific criteria for each certification level.

The manikin must be checked prior to testing to ensure proper performance. Testing should be uncoached and preferably, attended by only and the learner. The learner should be judged for performance according to the performance sheet (checklist).

Guidelines are provided to assist the instructor in learner evaluation. Acknowledge that some variation is acceptable and that some subjective evaluation must be made.

Proper sequencing and performing of the steps are the most important aspects of evaluation. Some variation in performance is acceptable. Recommended margins of error are presented in keeping with the philosophy that is better to accept a certain number of errors from a provider candidate, allowing him/her to complete the course successfully, than to have to fail the candidate because performance is not perfect.

Criteria for Successful Completion of BCLS+AED Course

Each learner must:

1. Score a passing grade (80%) on the written test; and
2. Demonstrate 100% competency in practical assessment, performing the BCLS+AED steps. A skill performance checklist will be used to evaluate the learner's performance. Critical performance should be followed closely with no coaching. The instructor should allocate a maximum testing time for each learner.
3. A total of 3 attempts are allowed on the same day for both theory and practical tests. A certificate is issued to students who pass both the theory and practical tests.

3.3 Practical Assessment Guidelines and Criteria

Learner must demonstrate proficiency in manikin performance for all the BCLS and AED modules. Specific criteria for performance are presented in the following:

3.3.1 Adult One-Rescuer CPR

Performance Steps:
(D) Check for **D**anger
(R) Check for **R**esponsiveness

- Tap the casualty's shoulder firmly
- Ask loudly: "Hello! Hello! Are you okay? if no response

(S) **S**hout loudly "Help! Call ambulance 995
(A) Ask someone to get **A**ED
(B) Check for normal **B**reathing

- Look for the rise & fall of the chest
- Check for breathing and pulse not more than 10 seconds
- Gasping is NOT a normal breathing but a sign of cardiac arrest

(C) Provide **C**ontinuous **C**hest **C**ompressions

- Depth of 4-6 cm
- compression rate of 100 to 120 per minute
- ensure complete chest recoil before starting next compressions
- Perform 30 compressions and 2 (BVM) ventilations
- After 30 chest compressions, open airway and perform BVM ventilations
- Complete 5 cycles of 30 compressions and 2 ventilations before reassessing breathing and circulation

For trained healthcare provider

- Check for normal breathing and pulse after every 5 cycles of CPR 30:2
- If normal breathing and pulse are pulse present or you are unsure, continue CPR
- If pulse is present and normal breathing is absent, perform rescue breathing at a rate of **12rescue breaths per minute** (one breath every 5 seconds)
- Reassess for normal breathing and pulse after 12 rescue breaths
- If both breathing and pulse are present, maintain the casualty in supine position and continuously monitor the casualty until help arrives

Continue performing CPR until:

- Paramedic takes over from rescuer; or
- AED prompts to analyse the casualty's heart rhythm, is charging or when shock is to be delivered; or

- Casualty wakes up or regains normal breathing
- Maintain casualty in supine position and continue to monitor the casualty until help arrives

Passing Criteria: Compression for Adult One-Rescuer CPR

- Total compressions to be given : 150
- Compressions errors allowed : 30
- Compression depth : 4 to 6 cm
- Compression rate : 100 to 120 per
- Total duration for 5 cycles of CPR : Within 130 seconds
- Complete chest recoil after each compression
- Immediate failure for wrong landmark (landmark visibly outside of body sternum

Passing Criteria: Ventilation for Adult One-Rescuer CPR

- Total ventilations to be given : 10
- Ventilation errors allowed : 5 (Less than 400 mls)
- Ventilation volume : 400-600 mls
- Ventilation duration : 1 second per breath
- There must be exhalation between breaths

3.3.2 Child CPR

This module addresses children from 1 to 12 years of age. Children in this age group rarely collapse owing to a primary heart problem. Cardiac arrest is usually secondary to other events, such as major trauma or respiratory illness. Therefore, rescuers must detect and promptly treat early signs of respiratory and circulatory failure to prevent cardiac arrest.

If a child is below 12 years old but of a larger size or a child that is above 12 years of age, perform chest compressions as in adult CPR.

Performance Steps:

(D) Check for **D**anger

(R) Check for **R**esponsiveness

- Tap the child shoulders firmly
- Ask loudly: “Hello! Hello! Are you okay?
    - Avoid violent shaking of the child as this may result in injury
    - Avoid unnecessary movements of the neck to prevent injuries to the head and neck
- If the child is unresponsive,

(S) **S**hout loudly "Help! Call ambulance 995

(A) Get **A**ED

(B) Check for normal **B**reathing and Pulse (for trained Healthcare Providers)

- Look for the rise & fall of the chest.
- Gasping is NOT a normal breathing but a sign of cardiac arrest
- Check for breathing and pulse not more than 10 seconds

(C) **C**ontinuous **C**hest **C**ompressions

- depth of 4-5 cm (1/3 the anterior-posterior diameter)
- compression rate of 100 to 120 per minute
- ensure complete chest recoil before starting next compressions
- Perform 5 cycles of 30 compressions and 2 ventilations
- After 30 chest compressions, open airway and perform BVM ventilations

For trained healthcare provider

- Check for normal breathing and pulse after every 5 cycles of CPR 30:2
- If normal breathing and pulse are pulse present or you are unsure, continue CPR 30:2
- If pulse is present and normal breathing is absent, perform rescue breathing at a rate of **20 breaths per minute** (one breath every 3 seconds)
- Reassess for normal breathing and pulse after 20 rescue breaths
- If both breathing and pulse are present, maintain the casualty in supine position and continuously monitor the casualty until help arrives

If there are 2 trained healthcare providers

- The ratio of chest compression to ventilation is 15:2
- Perform 10 cycles of 15 compressions and 2 ventilations within 2 minutes

Continue performing CPR until:

- Paramedic takes over from rescuer; or
- AED prompts to analyse the casualty's heart rhythm, is charging or when shock is to be delivered; or
- Casualty wakes up or regains normal breathing
- Maintain casualty in supine position and continue to monitor the casualty until help arrives

Performance Criteria

- The learner will be evaluated for proper sequencing, compression and ventilation.
- The correct hand position is critical.

3.3.3 Adult/Child Foreign Body Airway Obstruction (FBAO) Management

Conscious FBAO

Testing of the FBAO management sequence for the conscious adult may be done on a person provided that the thrusts are simulated.

Performance Steps:

The Heimlich Manoeuvre (Abdominal Thrust)

Step 1: Assessment

- Ask: "are you choking?" If the casualty is choking, the casualty will not be able to speak, breathe or cough, but may nod his/her head

Step 2: Position of rescuer

- If the casualty is standing, the rescuer stands behind the casualty
- If the casualty is sitting, the rescuer kneels and positions himself/herself behind the casualty
- Tell the casualty 'I can help'

Step 3: Locate Landmark

- Put your arm around the casualty's abdomen
- Locate the navel
- Place 2 fingers above the navel and well below the tip of the xiphoid process
- Make a fist with the other hand with thumb in the palm
- Place the thumb side of the fist against the casualty's abdomen, midline and above the 2 fingers' spacing

Step 4: Heimlich manoeuvre

- Lean the casualty forward with one hand, while maintaining the fist against the abdomen
- Grasp your fist with your other hand
- Give quick inward and upward abdominal thrusts in one motion into the casualty's abdomen
- Deliver each thrust firmly and distinctly with the intent of relieving the obstruction until the foreign body is expelled or the casualty becomes unconscious

Chest Thrusts

This technique is used as an alternative for **obese adult or pregnant casualties**

Step 1: Assessment

- Ask: "are you choking?" If the casualty is choking, the casualty will not be able to speak, breathe or cough, but may nod his/her head
- Tell the casualty 'I can help'

Step 2: Position of rescuer

- If the casualty is standing, the rescuer stands behind the casualty
- If the casualty is sitting, the rescuer kneels and positions himself/herself behind the casualty

Step 3: Locate Landmark

- Place your arms around the casualty's armpit encircling the chest
- Make a fist with the other hand with thumb in the palm
- Place the thumb side of the fist on the middle of casualty's sternum

Step 4: chest thrusts

- Grasp your fist with your other hand and bring yourself close to the casualty before giving quick backward thrusts
- Deliver each backward thrust firmly and distinctly with the intent of relieving the obstruction until the foreign body is expelled or the casualty becomes unconscious

Unconscious Adult/Child FBAO

If casualty becomes unconscious, proceed with the following steps

Step 1: **Position the casualty**

Support and position the casualty lying on his/her back on a firm flat surface.

Step 2: **Activate EMS**

Rescuer shout "Help! Call ambulance 995 and Get AED!"

Step 3: **Start 30 chest compressions**

Locate the landmark and perform 30 chest compressions using the same location and techniques used for chest compressions in CPR

Step 4: **open the airway**

- Perform head tilt-chin lift, to open the airway
- While maintaining head tilt, open the mouth gently to check for visible foreign bodies
- If no foreign body seen, perform another 30 chest compressions
- If a foreign body is seen, maintain open airway with head-tilt, chin lift manoeuvre and insert the index finger of your other hand into the casualty's mouth along the inside of the cheek
- Remove the foreign body by **finger sweep** maneuver
- Check for normal breathing. If there is no normal breathing, attempt one BVM ventilation by aligning the BVM mask onto casualty's mouth and nose to create a tight seal. Give a quick ventilation (1st ventilation)
- If there is **no resistance**, airway is clear. Check for normal breathing and pulse. If unsure of the presence of normal breathing and pulse within 10 seconds, start CPR.
- If there is resistance (i.e. chest does not rise), the airway may be blocked. Reposition the casualty's head with head tilt-chin lift. Re-attempt to ventilate (2nd ventilation)
- Repeat Step 3 to 4 until help arrives and takes over or the casualty starts breathing, coughing, talking, or moving
- Check for normal breathing and pulse
- If normal breathing or pulse are absent or you are unsure, start CPR
- If pulse definitely present but the casualty is not breathing, perform rescue breathing at a rate of 12 breaths per min for adult (one breath every 5 seconds) by giving one breath and counting **2-a-thousand**, **3-a-thousand**, **4-a-thousand**, **5-a-thousand**. For children, perform rescue breathing at a rate of 20 breaths per minute (one breath every 3 seconds) by giving one breath and counting **2-a-thousand, 3-a-thousand.** Repeat the sequence until you have completed a total of 12 breaths (for adult) or 20 breaths (for child)
- Re-assess for normal breathing and pulse
- If both breathing and pulse are present, monitor the casualty till helps arrives

Performance Criteria

The learner will be evaluated on proper sequencing, ventilation, compression, correct hand position, technique of abdominal and chest thrusts

3.3.3 Child CPR

This module addresses children from 1 to 12 years of age. Children in this age group rarely collapse owing to a primary heart problem. Cardiac arrest is usually secondary to other events, such as major trauma or respiratory illness. Therefore, rescuers must detect and promptly treat early signs of respiratory and circulatory failure to prevent cardiac arrest.

If a child is below 12 years old but of a larger size or a child that is above 12 years of age, perform chest compressions as in adult CPR.

Performance Steps:

(D) Check for **D**anger

(R) Check for **R**esponsiveness

- Tap the child shoulders firmly
- Ask loudly: "Hello! Hello! Are you okay?
    - Avoid violent shaking of the child as this may result in injury
    - Avoid unnecessary movements of the neck to prevent injuries to the head and neck
- If the child is unresponsive,

(S) Shout loudly "Help! Call ambulance 995

(A) Get **A**ED

(B) Check for normal **B**reathing and Pulse (for trained Healthcare Providers)

- Look for the rise & fall of the chest.
- Gasping is NOT a normal breathing but a sign of cardiac arrest
- Check for breathing and pulse not more than 10 seconds

(C) Continuous **C**hest **C**ompressions

- depth of 4-5 cm (1/3 the anterior-posterior diameter)
- compression rate of 100 to 120 per minute
- ensure complete chest recoil before starting next compressions
- Perform 5 cycles of 30 compressions and 2 ventilations
- After 30 chest compressions, open airway and perform BVM ventilations

For trained healthcare provider

- Check for normal breathing and pulse after every 5 cycles of CPR 30:2
- If normal breathing and pulse are pulse present or you are unsure, continue CPR 30:2
- If pulse is present and normal breathing is absent, perform rescue breathing at a rate of **20 breaths per minute** (one breath every 3 seconds)
- Reassess for normal breathing and pulse after 20 rescue breaths
- If both breathing and pulse are present, maintain the casualty in supine position and continuously monitor the casualty until help arrives

If there are 2 trained healthcare providers

- The ratio of chest compression to ventilation is 15:2
- Perform 10 cycles of 15 compressions and 2 ventilations within 2 minutes

Continue performing CPR until:

- Paramedic takes over from rescuer; or
- AED prompts to analyse the casualty's heart rhythm, is charging or when shock is to be delivered; or
- Casualty wakes up or regains normal breathing
- Maintain casualty in supine position and continue to monitor the casualty until help arrives

Performance Criteria

- The learner will be evaluated for proper sequencing, compression and ventilation.
- The correct hand position is critical.

3.3.4 Infant CPR

This module addresses the care of infants up to one year of age
Infant rarely collapse due to primary heart problem. Cardiac arrest is usually secondary to other events, such as major trauma or respiratory illness. Therefore, rescuers must detect and promptly treat early signs of respiratory and circulatory failure to prevent cardiac arrest.

Performance Steps:

(D) Check for Danger - Quickly assess the situation for danger, so that the rescuer operates in a safe environment

(R) Check for **R**esponsiveness

- The rescuer should tap the infant's shoulder or the sole and ask loudly: 'Hello! Hello! Are you ok?'
- Avoid violent shaking of the infant as this may result in injury
- Avoid unnecessary movement of the neck to prevent injuries to the head and neck

(S) Shout to get help

- If the infant is not responsive, he/she is likely to be unconscious. This may be due to:

  - An airway that is obstructed (blocked) by the tongue that has fallen backwards, food or secretions
  - Breathing that has stopped
  - The heart that has stopped beating, usually because of a heart disease
- **S**hout loudly for help and immediately call "995" for an emergency ambulance

(A) Get AED

- Ask someone to get AED if there is one within a 60 seconds walking distance

(B) Check for normal Breathing

- **Look** for the rise and fall of the chest not more than 10 seconds. It is important to recognise that gasping is **NOT** a normal breathing but a sign of cardiac arrest

(C) Chest Compressions

- Start chest compressions immediately if you are unsure whether the casualty has normal breathing or gasping
- Site of chest compression should be at the centre of the chest at lower half of the sternum
  - Use index finger to draw an imaginary line between nipples to the centre of the sternum
  - Place middle (third), and ring (fourth) fingers next to index finger on the centre of the infant's chest
  - Lift up index finger but maintain the middle and ring fingers and commence chest compressions using the pulp of the fingers
  - Compression depth 3-4 cm (1/3 of the anterior-posterior diameter of the infant's chest.
  - The compression rate is 100-120 per minute
  - Ensure complete chest recoil after each compression

For trained healthcare providers

- Check for normal breathing and pulse after every 5 cycles of CPR 30:2
- If normal breathing and pulse are absent or unsure, continue CPR 30:2
- If pulse is present and normal breathing is absent, perform rescue breathing at a rate of **30 breaths per minute** (one breath every 2 seconds) by giving one breath and counting **2-a-thousand**
- Re-assess for normal breathing and pulse after 30 breaths
- If both breathing and pulse are present, position the infant in supine position and continuously monitor the casualty until help arrives

If there are 2 trained healthcare providers

- The ratio of chest compression to ventilations is 15:2
- Perform 10 cycles of 15 compressions and 2 ventilations within 2 minutes

Continue performing CPR until:

- Paramedic takes over from rescuer; or
- AED prompts to analyse the casualty's heart rhythm, is charging or when shock is to be delivered; or
- Casualty wakes up or regains normal breathing
- Maintain casualty in supine position and continue to monitor the casualty until help arrives

Performance Criteria

- The learner will be evaluated for proper sequencing, ventilation and compression.
- The correct fingers position is critical.

3.3.5 Infant Foreign Body Airway Obstruction (FBAO) Management

Performance Steps:

Conscious Infant

Step 1: Assessment

- Infant is conscious and has stridor breathing
- If obstruction is getting worse (complete airway obstruction) with at least one of the following:
    - Loss of voice
    - Increased breathing difficulty
    - Infant's face may turn blue
- Immediately attempt to relieve the airway obstruction

Step 2: Back blows and chest thrusts technique

- Slide your arm under the infant to support the head with your palm and the back with your forearm
- "Sandwich" the infant with your other hand by
    - Support the infant's jaw with your thumb on one side and the rest of your fingers on the other side
    - Place your forearm on the infant's chest
    - Support the infant's head and body as a unit
    - Stride one leg forward, bending at a knee keeping your foot flat on the floor. Do not tip toe
    - Straddle the infant facing downwards with the head lower than the body
    - Rest the forearm, which supporting the infant's chest onto your thigh, making sure the infant's head is lower than the body
- Deliver 5 back blows forcefully between the shoulder blades with the heel of your other hand
- "Sandwich" the infant and turn the infant over with head lower than the body
- Rest your forearm supporting the infant's back onto your thigh (on the same side) to support the infant
    - Draw an imaginary line between the nipples with the ring finger to the centre of the sternum
    - Place your middle and index fingers next to your ring finger
    - Lift up your ring finger and deliver 5 chest thrusts over the lower half of the sternum using same technique as chest compressions in CPR
    - If foreign body is seen, place the infant on a firm flat surface and remove foreign body with your little finger

- Repeat back blows and chest thrusts until foreign body is expelled or infant becomes unconscious

Performance Criteria

- The learner will be evaluated for proper sequencing, technique of sandwich manoeuvre, technique of back blows and chest thrusts
- The correct hand position is critical

Relief of Unconscious Infant FBAO

If the infant becomes unconscious, proceed the following steps

Step 1: Position the Infant

- Support and position the infant lying on his /her back on a firm flat surface

Step 2: Activate EMS

- Shout "Help! Call ambulance 995 and Get AED!"

Step 3: Start 30 chest compressions

- Locate the landmark and perform 30 chest compressions using same location and techniques as in CPR

Step 4: Open airway

- Perform head tilt-chin lift to open the airway
- While maintaining head tilt, open the mouth gently to check for visible foreign bodies
- If there is no foreign body seen, perform another 30 chest compressions
- If foreign body seen, maintain open airway with chin-lift and insert the little finger of your other hand into the infant's mouth and remove the foreign body by finger sweep
- Check for normal breathing. Look for the rise and fall of the chest
- If there is no normal breathing, attempt to ventilate by aligning BVM mask onto infant's mouth and nose. Give a quick 30 mls. breath (1st ventilation)
- If there is **no resistance**, airway is clear. Check for normal breathing and pulse, and if absent, start CPR
- If there is resistance (chest does not rise), this indicates that the airway may be blocked. Re-position the infant's head with head tilt-chin lift and re-attempt 2nd BVM ventilation
- Repeat Step 3 to 4 until help arrives and take over or the infant starts breathing, coughing, talking or moving
- Check for normal breathing and pulse
- If normal breathing or pulse are absent or you unsure, start CPR
- If pulse is definitely present but the infant is not breathing, perform rescue breathing at 30 breaths per minute (one breath every 2 seconds) by giving one breath and count **"2-a-thousand"** Repeat the sequence until completed 30 breaths. Reassess for normal breathing and pulse
- If both breathing and pulse are present, monitor the infant until help arrives

Performance Criteria

- The learner will be evaluated for proper sequencing, compression and ventilation.
- The correct hand position is critical.

3.4 AED PERFORMANCE STEPS

AED KEY POINTS

1. FUNCTION OF AED

- Define AED
- Purpose of AED

2. INDICATION

- Unconscious
- No breathing
- No pulse

3. SAFETY ISSUE

- Exclude AED Danger (water, metal, gas)
- Defibrillation Danger – ensure no one is touching the casualty before defibrillation

4. CHEST PREPARATION

- Remove jewelry
- Shave excessive chest hair
- Check for any pacemaker or any implantable device
- Remove medication patch
- Wipe off sweat
- Apply defibrillation pads

5. FEATURES OF AED

6. DOCUMENTATION

- Time of collapse
- Time AED put on
- Time of each shock & Number of shocks
- Time of ambulance arrival
- Name of casualty, AED operator, bystander involved in the resuscitation

7. HOUSEKEEPING

- Stock replenishment
- Battery self-test
-

8. OPERATION STEPS (Refer to AED operation steps)

3.4.1 CPR OPERATION STEPS

D **Danger**	Check for danger & ensure scene is safe for you and the casualty
R **Response**	Assess responsiveness
S **Shout**	If no response, shout for help Call ambulance 995, follow dispatcher's instruction
A **Get AED**	✓ If there is another person around, ask him/her to get the AED ✓ If alone, only get AED if it is visible and nearby
B **Breathing**	Check for normal breathing – Look for the rise and fall of the chest. Not more than 10 seconds. It is important to recognize that gasping is **NOT** a normal breathing, it is a sign of cardiac arrest If no breathing, start CPR (for laypersons only)
C **Circulation**	Check pulse (for Healthcare providers only) If no breathing / no pulse – start CPR Combination of Pulse and Breathing checks should not take longer than 10 seconds Continue to do CPR until AED arrives

3.4.2 AED OPERATION STEPS

1.	Arrival of AED
2.	Exclude AED danger – water, metal, gas
3.	Chest preparation
4.	Operate AED – Push ON button follow the voice advise
5.	**AED Shock Protocol**
	a. Shockable Rhythm • Analyse → Shock → CPR (1-2 mins) → Analyse → Shock → CPR (1- 2 mins) • Repeat the sequence if shock is advised
	b. Non-Shockable Rhythm • Analyse → No Shock → Check breathing / pulse • Breathing / Pulse **ABSENT** → CPR (1-2 mins) → Analyse → repeat the whole sequence • Breathing / Pulse **PRESENT** – put the casualty in recovery position. Continue to monitor the casualty till help arrives.

3.4.3 CPR (MTM) + AED Procedure

The correct sequencing is as follow:

A) Cardiopulmonary Resuscitation

1st Rescuer

1. Survey Scene & Check for Danger
2. Check Response – Call, tap on casualty's shoulder firmly and ask loudly "Hello! Hello! Are you ok? No respond,
3. Call ambulance 995
4. Get AED
5. Check breathing – Look for the rise and fall of the chest wall. It is important to recognize that gasping is NOT a normal breathing; it is a sign of cardiac arrest.
6. **LAYPERSON** – If breathing is absent, start chest compressions immediately
7. **HEALTHCARE PROVIDERS ONLY** – Check Pulse. Combination of pulse and breathing checks should not take longer than 10 seconds.
8. Perform CPR (30 compression & 2 ventilations)
    - Correct body and hand position
    - Demonstrate correct technique of compression
        - Compress vertically at 4 to 6 cm downwards with complete relaxation of chest pressure after each compression at rate of 100 to 120 per minute
        - Say mnemonic (1&2&3&4&**5**& 1&2&3&4&**10**& 1&2&3&4&**15** 1&2&3&4&**20** 1&2&3&4&**25** 1&2&3&4&**30**)
    - Give cycles of 30 compressions followed by 2 ventilations
    - Perform CPR until ambulance / AED arrives.

B) AUTOMATED EXTERNAL DEFIBRILLATION (AED)

2ND Rescuer

1. Check for AED dangers (e.g. water, metal & flammable gases)
2. Chest preparation (e.g. hair, medication patches, pacemaker & jewellery)
3. Operate the AED :
   - Press ON button
   - Attach defibrillation pad
4. Observe AED safety measures
   - Ensure that no one is touching the patient when the defibrillator is analyzing heart rhythm
   - Say "Stand Clear" and ensure that no one is touching the patient when the defibrillator is delivering the "SHOCK"
   - Deliver the shock as advised by AED

Perform CPR for 1 minute

- 1st rescuer perform chest compression
- 2nd rescuer perform BVM ventilation (i.e. maintain head tilt-chin lift and gives 2 breaths after every 30 compressions by the 1st rescuer)

5. If AED analysis indicate "**No Shock Advised**" and pulse / breathing present:
   - Maintain open airway with AED remains connected
   - Continue to monitor casualty's pulse and breathing every 2 minutes till paramedic arrives
6. Report and documentation

Evaluation criteria

To complete the BCLS+AED course successfully, each participant must:

1. Score a passing grade (80%) on the theory assessment; and
2. For practical assessment, participant must demonstrate 100% competency in the BCLS+AED steps. A skill checklist will be issued to evaluate the participant's performance. Performance in accordance with SRFSC standard guideline is required. Critical performances should be followed closely with no coaching. The instructor should allocate a maximum testing time per station per student.
3. A total of 3 attempts are allowed on the same day for both theory and practical assessment. A certificate is issued to participants who pass both the theory and practical assessment.

3.4.4 CHILD/INFANT AED Procedure

Use of AED for Child/Infant

- AEDs can be used safely for children aged one year or older.
- AEDs are capable of accurately identifying arrhythmias in children; they are very unlikely to advise a shock inappropriately.
- Those aged between 1–8 years should preferably be defibrillated with paediatric pads if available.
- If an AED with paediatric pads is not available, an AED with adult pads may be used.
- For casualties less than one year old, the incidence of shockable rhythms is very low unless if they are suffering from cardiac disease.
- In these cases, the risk/benefit ratio may be favourable, and the use of an AED (preferably with paediatric pads) should be considered.

Placement of Defibrillation Pads for Children/Infant

1. Anterior-anterior defibrillation pads placement is advised. **Ensure that the pads are not touching** and are at least 1-2cm apart (see figure A1).

Figure A1 -Anterior- anterior AED electrode pads placement

2. **If the pads are touching**, apply front (right pad on central sternum) and back (left pad on the upper back between the shoulder blades). Attach the child defibrillation pads on front and back (anterior- posterior) as shown (see figure A2):

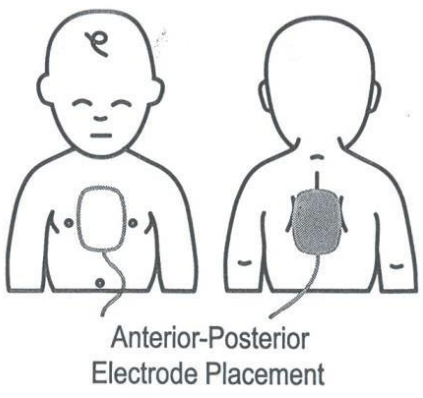


Figure A2

The following scenarios may be used by the instructor to depict possible situations which you may encounter due to the varied nature of an emergency. By practicing these scenarios, you can be more confident to assist a casualty in emergencies.

1) Shock – No Shock – No Shock
2) No Shock – Shock – No Shock
3) Shock – Shock – No Shock
4) No Shock – No Shock – Shock
5) No Shock – No Shock – No Shock

MODULE 4 : SAFETY DURING BCLS+AED TRAINING

Dos

- Mask-up at all times
- Practice social distancing at 1 meter apart is encouraged to be maintained while on mask-off activity e.g. during tea-break / meal break
- Disinfect/wash hands thoroughly before and after every hands-on practice
- Disinfect Manikins and all re-usable training equipment (AED trainers, BVM, Laptop/Simpad) with disinfectant wipes after each use
- Simulate finger sweep when removing foreign body in an obstructed airway
- Female participants to:
    - inform chief instructor if you are pregnant
    - remove lipstick before training session
    - tie-up or bun-up long hair
- Participants must inform chief instructor on duty before the training begins if they :
    - have weeping dermatologic lesions on their hands, or in oral or circumoral areas
    - are known to be seropositive for HBs Ag
    - have known medical problem
    - do not come for training if unwell (fever with ARI symptoms)
    - had been advised by doctor not to exert themselves
- Keep finger nails short to prevent leaving a puncture marks on the manikins
- Handle all manikins and training equipment with care
- Decontaminate all used manikin's faces and change the disposable lungs after each training sessions

Don'ts

- No eating or drinking during class to avoid contamination of manikins with food particles
- Do not mark any area of the manikin
- Do not open the manikin's mouth beyond 2.5cm

Injury Control

Injury control is also another safety perspective all instructors need to be aware of. Person attending BCLS+AED training, sometimes report pain in the hands, over the shoulders and low back during and after the training session. Most of these aches and pains are temporary and can be reduced or minimized with correct positioning and posture techniques. The following would be recommended during BCLS+AED skills practice to minimize incidence of such aches and pains:

- Correct placement of the heel of the palm on the lower half of the sternum, which is a smoother surface than on the sterno-costal junctions which are irregular and causing hand discomfort when pressed on.
- In manikin with zipped or button shirt, ensure that the hands are not placed directly on the button or zip structure. This would be an additional cause of hand pain during CPR. Move the buttoned or zipped portion aside.
- Teach all participants to lock their elbows and use body weight when doing chest compressions. This will result in the participant not using upper arm and shoulder strength thus preventing strain to the muscles and ligaments serving these structures. Pain in the shoulders and upper arms that occur during CPR training is most often due to use of elbow strength, frequent flexion and extension of the elbow during CPR. This can be avoided simply by adopting correct chest compression techniques.
- Occurrence of low back pain during performance of CPR can be avoided by teaching participants to use their hips as the fulcrum when doing chest compressions rather than their lower back. To achieve this, it is important to consciously keep their backs straight. Instructors should guide participants to adopt correct posture and help to minimize instances of aches, pain and strains during CPR training.

MODULE 5 : MANIKIN TROUBLESHOOTING & MAINTENANCE

5.1 COMMON FAULTS AND TROUBLESHOOTING IN CPR

The common faults that occurring during CPR are:

Procedure	Fault	Cause(s)	Troubleshooting
Ventilation	Overinflation	Excessive ventilation volume and rapid flow rates	1. Provide short breaths only until chest rise visibly. Exceeding this level of chest rise can result in Over inflation.
	Underinflation	Improper opening of the airway	1. Perform the Head tilt-chin lift maneuver correctly. 2. Maintaining a tight seal of mouth and nose before ventilating. 3. 0.4 to 0.6 litres of air is required.
Mechanical Problems	Chest wall does not rise during inflation	Airway wrongly assembled	1. Check that airway assembly is placed correctly.
Chest Compressions	Ineffective compression	1. Incorrect placement of hands 2. Using hand strength to compress	1. Check landmark prior to compression 2. Use the body weight to depress at 4-6 cm 3. Compression should be smooth and uninterrupted.
	Wrong hand position	1. Chest is depressed with hands placed outside the correct area of compression.	1. Relocate hand placement for chest compression. 2. Maintain hand position throughout compression

5.2 MANIKIN DISINFECTION

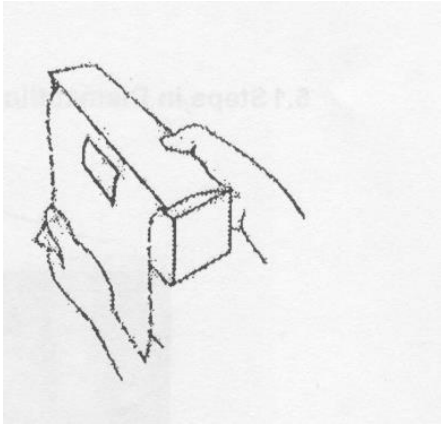
Manikin disinfection is necessary during and after each training session to ensure proper hygiene and minimize potential cross infection.

During Training	
Action	**Manikin Disinfection Action**
1.	Disinfect Manikins and all re-usable training equipment (AED trainers, BVM, Laptop/Simpad) with disinfectant wipes after each use
2.	Disinfect/wash hands thoroughly before and after every hands-on practice

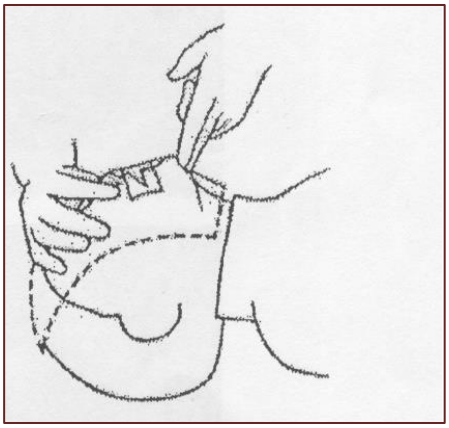
After Training	
Action	**Manikin Disinfection Action**
1.	Detach the face mask from the manikin
2.	Wash with soap and water
3.	Disinfect the face mask according to the individual training centre guidelines. Recommended disinfectant solutions are: a. Sodium hypochlorite 0.5% b. Sodium dichloroisocyanurate (presept) c. Chlorhexidine 0.5% in spirit or methylated spirit (alcohol) 70% d. Biospot Effervescent / ActichlorTablets – 1 Table (2.5 Gm) in 12 L of water. Immerse reusable protective face shield in the solution for at least 30 minutes. Rinse and put to dry.
4.	Replace disposable lung

5.3 USE OF MANIKIN FACE SHIELDS

Manikin Face Shields (Optional)



Proper disinfection of manikin's face provides proper hygienic conditions during training. However, for aesthetic reasons students may feel more comfortable having a clean barrier between own lips and surfaces touched by another person's lips. The Manikin Face Shields are designed to allow inexpensive barrier protection and to train the use of Resusci Patient Face Shields made for use in real cases.

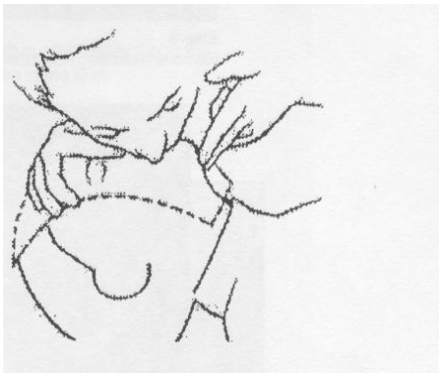


To use manikin face shield.

Disinfect as instructed above.

Pull a shield out of the roll and tear off at perforation.

Place shield over manikin's face as illustrated.



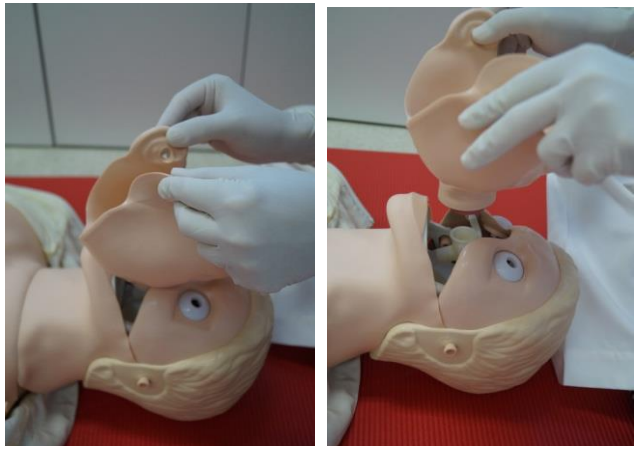
Hold shield in place and airway open, as illustrated.

Place your lips over the ventilation opening, pinch the nose and ventilate.

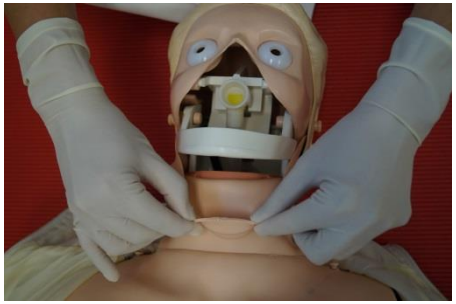
Discard shield after each practice session.

5.4.1 Steps for Changing face skin and Disposable Airways of Resusci Anne Manikin (Disassembling)

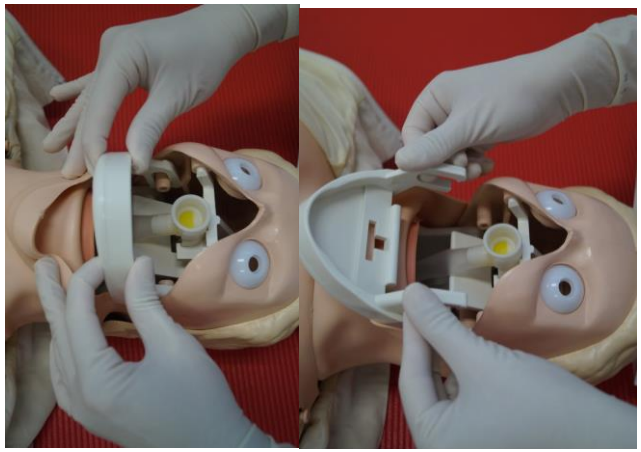
Step 1: Unfold Face Skin



Step 2: Flip two sides of Face Skin and remove it

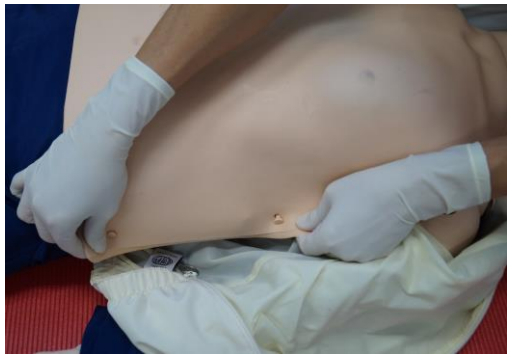


Step 3: Unfold the skin of the jaw



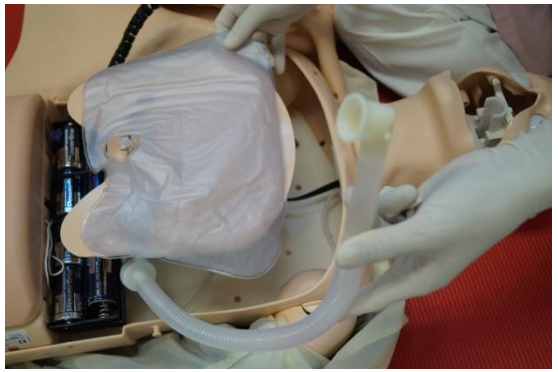
Step 4: Remove the jaw piece

Step 5: Disconnect the mouth piece

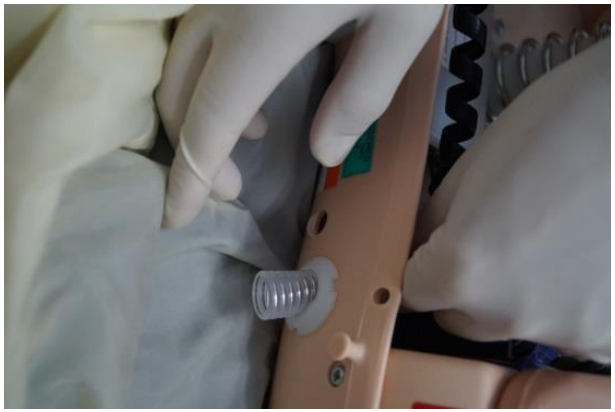


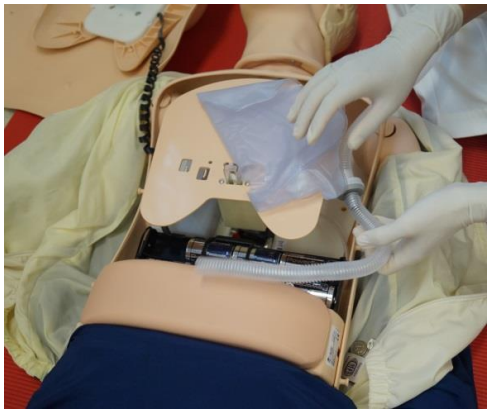
Step 6: Loosen the chest plate

Step 7: Remove the chest plate



Step 8: Withdraw the mouth piece





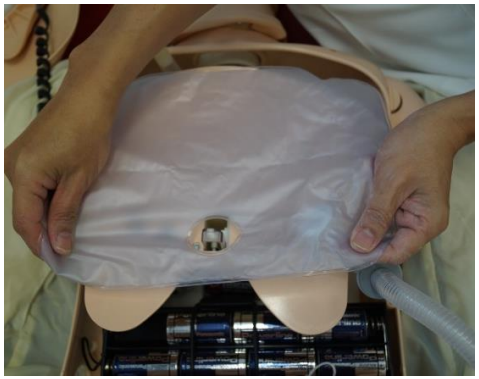
Step 9: Withdraw the exhaust piece

Step 10: Connect opening of both mouth piece and exhaust piece

Step 11: Discard the disposable airway

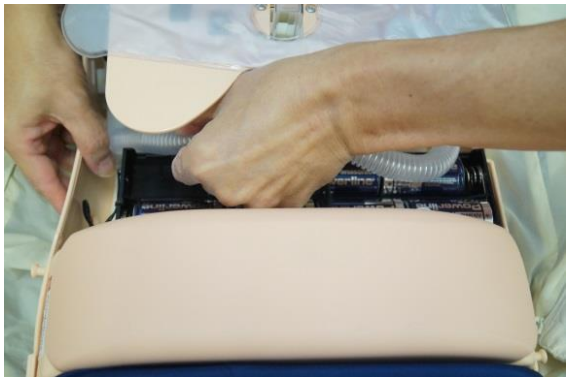
5.4.2 Steps for Changing face skin and Disposable Airways of Resusci Anne Manikin (Assembling)

Step 12: Obtain a new disposable airway



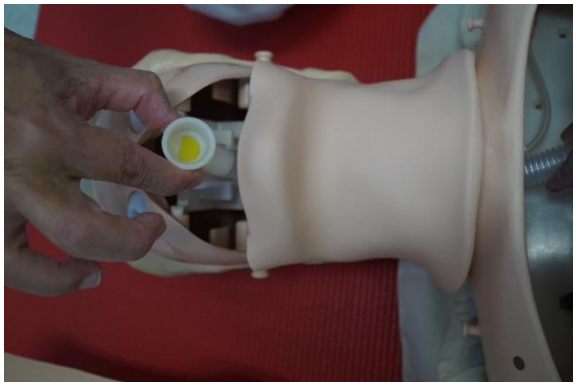
Step 13: Fit the disposable airway to Inner chest cover

Step 14: Attach the disposable airway and secure it to the inner chest cover

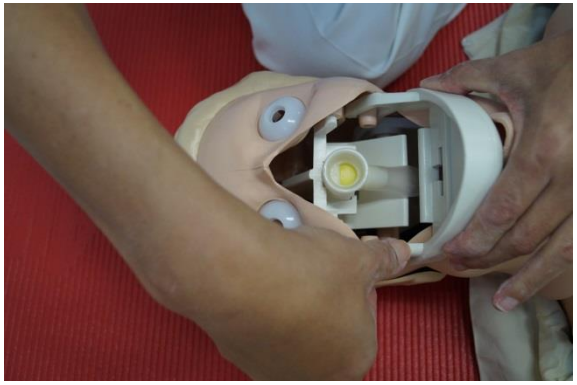
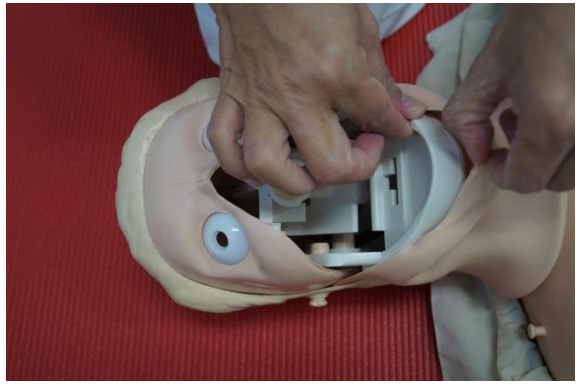


Step 15: Position the exhaust piece

Step 16: Get ready to thread through the mouth piece



Step 17: Position the mouth piece

Step 18: Fit in the jaw




Step 19: Fit in the Face Skin



Step 20: Fit in the outer Chest Cover

Step 21: Bag and mask to test air entry

MODULE 6 : OPERATING PROCEDURES OF LIFEPAK 1000

INTRODUCTION TO LIFEPAK 1000

The Medtronic LIFEPAK 1000 Defibrillator is an Automated External Defibrillator (AED).

When the electrode pads are applied to the casualty's ex0osed chest, the AED analyzes the casualty's heart rhythm. If a shockable rhythm is detected, the AED will direct the operator, using both audio and visual guides, to deliver an intense pulse of electricity (shock) to the heart muscle. The shock is delivered through the electrode pads on the chest. Delivery of this pulse of electricity is called defibrillation.

Defibrillation is the recognized means of treating life-threatening irregularities of the heart beat, such as ventricular fibrillation, that cause cardiac arrest. Cardiac arrest is usually caused by a malfunction of the heart's electrical system, which prevents the heart from pumping blood throughout the body. This critical condition can cause death within minutes.

The LIFEPAK 1000 defibrillator is a semiautomatic model that can be operated in either of three modes: AED mode, Manual mode, and ECG mode. The defibrillator uses the patented Physio-Control Shock Advisory System™ (SAS) to analyze the patient's electrocardiographic (ECG) rhythm and prompts you when it detects a shockable rhythm and when it does not detect a shockable rhythm. Responder interaction is required to provide therapy (defibrillation) to the patient.

Defibrillator Features

Heart Rhythm Analysis
The patented Physio-Control Shock Advisory System evaluates the patient's heart rhythm.

ECG Display (optional)
This feature allows display of the ECG using the 3-wire (Lead II) cable and when using the defibrillator in AED mode. This feature is also necessary to use the defibrillator in Manual Mode.

Defibrillation Waveform
The defibrillation shock, using ADAPTIVTM Biphasic technology, is delivered in the form of a biphasic truncated exponential (BTE) defibrillation waveform. LIFEPAK biphasic defibrillators measure the patient's transthoracic impedance and automatically adjust the defibrillation waveform current, duration, and voltage to meet the needs of the individual patient. Patient impedance is measured whenever defibrillation electrodes are in contact with the patient.

cprMAX™ Technology
The cprMAX technology is designed to allow resuscitation protocols to maximize the amount of CPR administered during the treatment using the LIFEPAK 1000 defibrillator.

When used with the factory default settings enabled, the defibrillator allows AED protocols to be consistent with the 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care and European Resuscitation Council Guidelines for Resuscitation 2010.

Data Management
The LIFEPAK 1000 defibrillator digitally records patient data, including ECG rhythm and delivered shocks. Recorded data may be transferred from the defibrillator to a PC using an infrared connection. The PC must have LIFENET products installed to collect and review the recorded patient data.

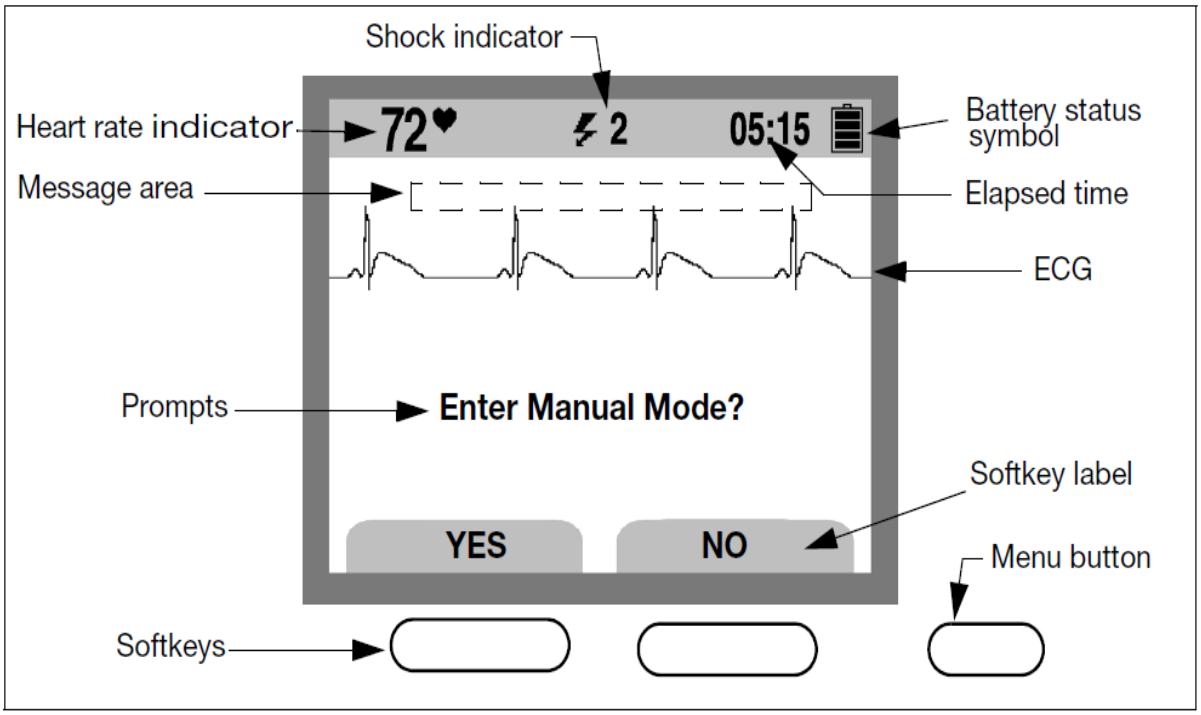
Daily Self-Test
The defibrillator performs a daily self-test every 24 hours and every time you turn on the defibrillator. This feature tests the most important circuitry in the defibrillator to give the responder a high degree of confidence that it is ready for use.

Readiness Display
The LIFEPAK 1000 defibrillator includes a readiness display. The OK symbol appears in the display if the daily self-tests is completed successfully. A battery symbol that approximates the remaining state of charge is also visible. If the self-test detects that service is required, the OK symbol disappears and the service symbol appears.

Battery
The non-rechargeable battery never requires recharging. The approximate level of charge in the battery is indicated by the fuel gauge on the battery, on the readiness display when the defibrillator is off, or on the screen when the defibrillator is in use.

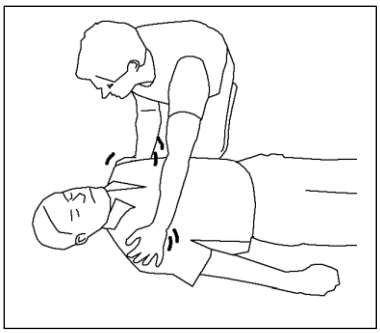
When optimally maintained, a new non-rechargeable battery pak can provide approximately 17 hours of “ON” time or 440 discharges at 200 joules.

CONTROLS AND INDICATORS



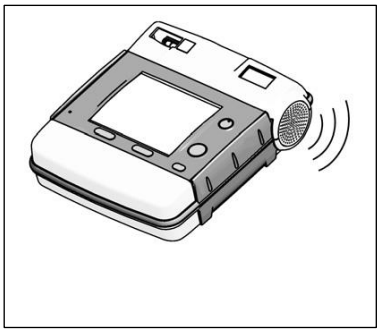
BASIC STEPS FOR USING THE LIFEPAK 1000 DEFIBRILLATOR

Step 1 –Preparation

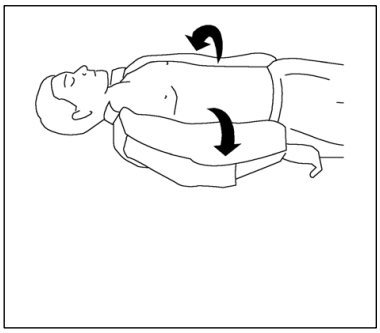


1. Establish that the patient is in cardiopulmonary arrest (the patient must be unresponsive, not breathing normally and showing no signs of circulation).

- Request others for help. Call 995 for emergency ambulance service.
- Place the LIFEPAK 1000 next to the casualty, as soon as possible.

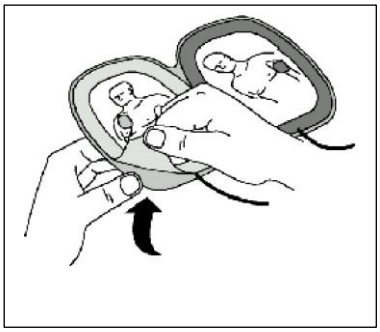


2. Press ON/OFF to turn on the defibrillator (the green LED illuminates). Voice prompts will sound, guiding you through the rescue process.



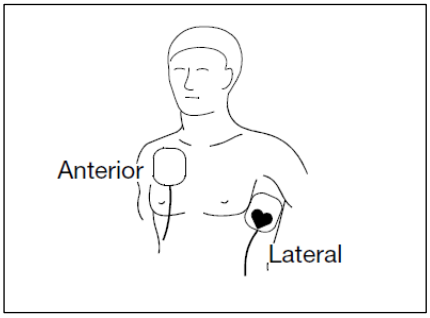
3. Prepare the patient for therapy electrode placement.

- If possible, place the patient on a hard surface away from standing water.
- Remove clothing from the patient's upper torso.
- Remove excessive hair from the electrode sites. If shaving is necessary, avoid cutting the skin.
- Clean the skin and dry it briskly with a towel or gauze.
- Do not apply alcohol, tincture of benzoin, or antiperspirant to the skin.



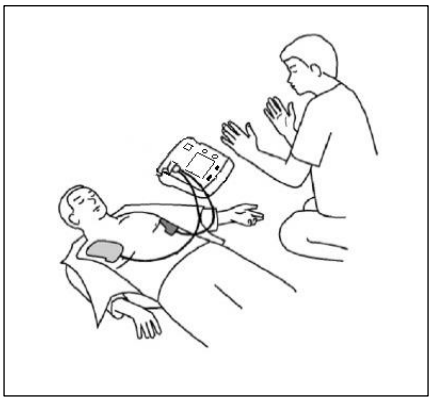
4. Open the therapy electrode packet and remove the electrodes. Slowly peel back the protective liner on the electrodes, beginning with the cable connection end. Safely discard the liner to prevent slipping.

5. Connect the electrodes to the defibrillator (if they are not already connected).



6. Apply the therapy electrodes to the patient's chest. Starting from one end, press the electrodes firmly onto the patient's skin, as shown.

Step 2 – Analysis and Monitoring



7. As soon as the electrode is connected properly.
- The LIFEPAK 1000 automatically begins analysing the casualty's heart's rhythm.
- Listen to the voice prompts.
- Do not touch the casualty unless instructed to do so.

If no shock is advised, the LIFEPAK 1000 will instruct you to

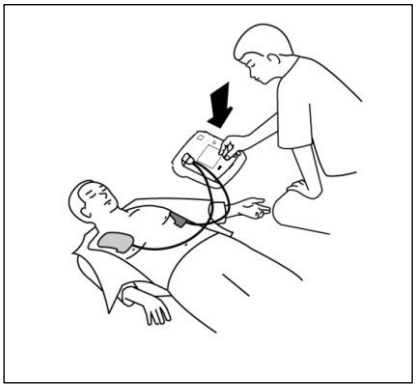
- **"Check for pulse"**
- **"If no pulse, start CPR"**
- **"Provide rescue breath and chest compression"**

If shock is advised, the LIFEPAK 1000 will instruct you to

- **"Stand clear, push SHOCK button"**
- **Everyone clear – make sure no none is touching the casualty, and**
- **PRESS SHOCK BUTTON**

LIFEPAK 1000 will also emit a warning tone.

Step 3 – Shock Delivery

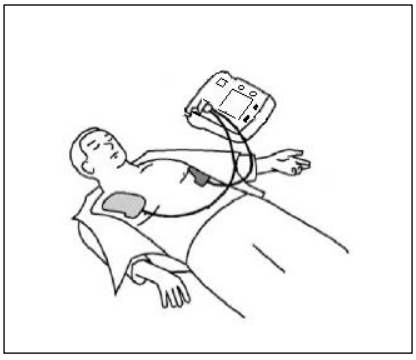


8.

- Make sure no one is touching the casualty.
- Press the red, flashing SHOCK button to deliver the shock.
- The LIFEPAK 1000 will then tell you the shock was delivered and to begin providing chest compressions and rescue breaths.
- After one minute of CPR, the LIFEPAK 1000 goes back to analysing to see of a shock is advised.
- Follow the voice prompts.

Note

- When the LIFEPAK 1000's energy is fully-charged, If you do not press the SHOCK button within 15 seconds of being prompted, the LIFEPAK will disarm itself and re-evaluate the casualty's heart rhythm.
- Follow the voice prompts.

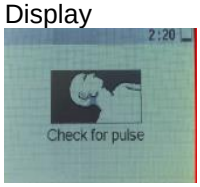


9.

- If casualty starts moving or breathing, keep the electrode pads on the casualty and connect to LIFEPAK 1000.
- Attend to casualty as instructed in your CPR training.

FEATURES OF LIFEPAK 1000

	Feature	Description
1	Readiness display	The readiness display alerts you to the defibrillator's readiness status. Three symbols ( , OK, ) allow you to determine whether the defibrillator is ready for use or needs attention. The following defines what each symbol represents and when/where each appears.
		The wrench indicator appears on the readiness display when a condition exists that prevents or could prevent normal defibrillator operation.
	OK	The OK symbol indicates that the defibrillator is ready for use. This symbol is visible only when the defibrillator is off.
		The battery symbol appears on the readiness display when the defibrillator is off. When one bar is visible in the symbol, the battery is low. If the symbol is blank, the battery is extremely low and the OK symbol will not appear when the defibrillator is off.
2	Speaker 	Provides audio voice prompts and tones.
3	ON/OFF button 	Green ON/OFF button turns the power on or off. The button is lit whenever the defibrillator is on.
4	SHOCK button 	Pressing the SHOCK button (when flashing) delivers a shock to the patient.

	Feature	Description
5	MENU button 	Used to select operating modes (Manual or AED) and enter information in Setup mode.
6	Softkeys 	Two softkeys work in conjunction with the screen, providing a way for you to make selections while using the defibrillator. The softkey functions vary, depending on the task you are performing at the time. Their function is identified by the label above them on the screen.
7	Display 	Displays pertinent information for use during all modes of operation.
8	Electrode socket 	For connecting defibrillation electrodes (black) and training ECG cables (Green).

TROUBLESHOOTING

This section explains problem conditions that you may encounter while using the defibrillator.

Observation	Possible Cause	What To Do
Screen blank and ON LED lit.	Screen not functioning properly.	• AED and therapy functions may still operate. If needed for therapy, follow voice prompts and continue to use device to treat patient. If unable to use voice prompts for any reason, administer CPR if the patient is not responding, not breathing normally, and showing no signs of circulation • Contact authorized service Personnel.
CONNECT ELECTRODES voice prompt is heard.	Poor electrode-to-skin contact. Electrode pads are dry, damaged, or have passed the expiration date. Electrode pads are not removed from the liner.	• Firmly press electrodes on patient's skin. • Clean, shave, and dry the patient's skin prior to placing pads on skin. • Replace the electrode pads. • Remove the electrode pads from the liner and apply them to the patient's chest
CHECK CONNECTOR AND ELECTRODES voice prompt is heard.	Connection to the defibrillator is inadequate.	• Check to be sure that the electrode connector is completely inserted.
Defibrillator cannot deliver the required shock.	Defibrillator battery power is low.	• Administer CPR if the patient is not responding, not breathing normally, and showing no signs of circulation. • Check battery indicator. Replace battery if needed.
Voice prompts sound faint or distorted.	Defibrillator battery power is low.	• Administer CPR if the patient is not responding, not breathing normally, and showing no signs of circulation. • Check battery indicator. Replace battery if needed.

Observation	Possible Cause	What To Do
MOTION DETECTED and *STOP MOTION* voice prompts are heard.	Patient movement because of location. Patient movement because of breathing. CPR being performed during analysis. Vehicle motion. Electrical/radio frequency interference.	• Move patient to stable location, if possible. • Check patient for normal breathing. • Stop CPR during analysis. • Stop vehicle during analysis, if possible. • Move communication or other suspected devices away from the defibrillator when possible.
Defibrillator does not deliver voice prompts or beeping tones after you turn it on.	Speaker not functioning. Depleted battery.	• AED and therapy functions may still operate. If needed for therapy, follow screen prompts and continue to use device to treat patient. If unable to use screen prompts for any reason, administer CPR if the patient is not responding, not breathing normally, and showing no signs of circulation • Contact authorized service personnel. • Administer CPR if the patient is not responding, not breathing normally, and showing no signs of circulation • Check battery indicator. Replace battery if Needed • Contact authorized service personnel.
The readiness display is blank.	The defibrillator has been turned on. Operating temperature is too low. LCD not operating properly.	• Normal condition when the defibrillator is in use. • Operate the defibrillator within the specified temperature range. • Contact authorized service personnel.

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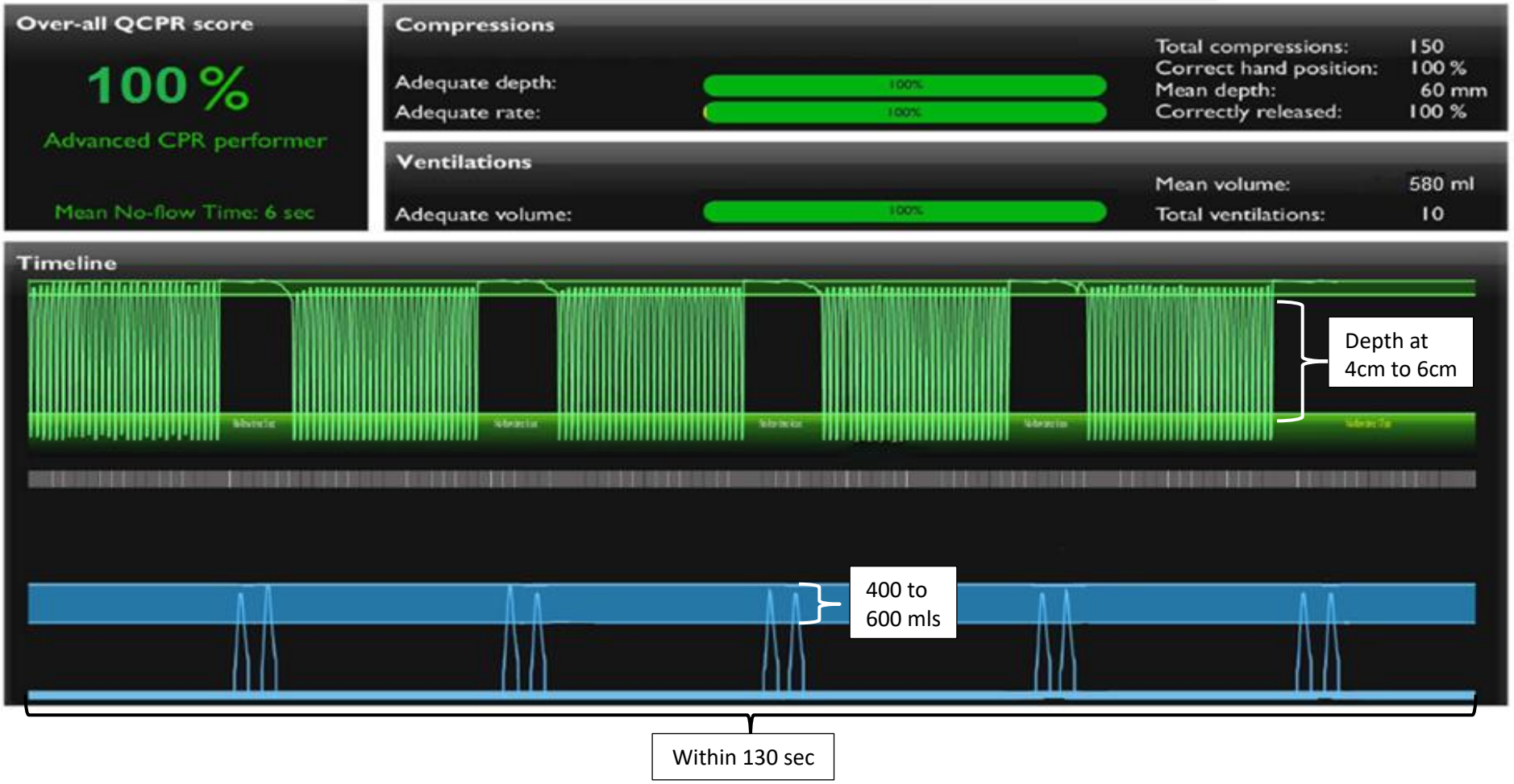
7.1 ONE-MAN CPR GRAPH INTERPRETATION



Passing Criteria:

1) Not more than 30 compression & 5 ventilation errors

2) Immediate failure for wrong landmark location for chest compression e.g. outside the lower half of sternum.

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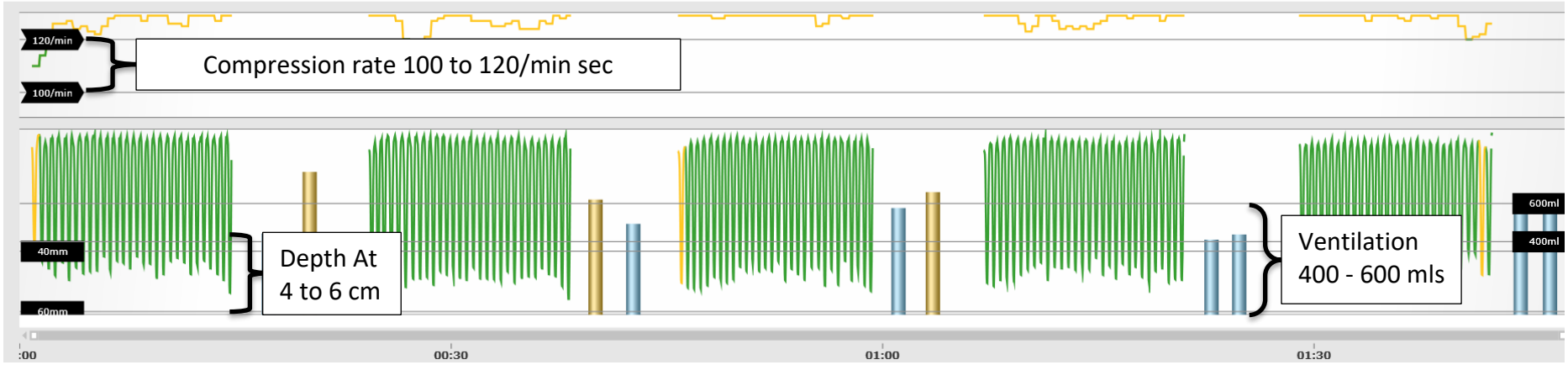
7.2 ONE-MAN CPR GRAPH INTERPRETATION



Within 130 sec

Passing Criteria:

1) Not more than 30 compression & 5 ventilation errors
2) Immediate failure for wrong landmark location for chest compression e.g. outside the lower half of sternum.

7.3 CPR(MTM) Strip Interpretation –Resusci Anne QCPR

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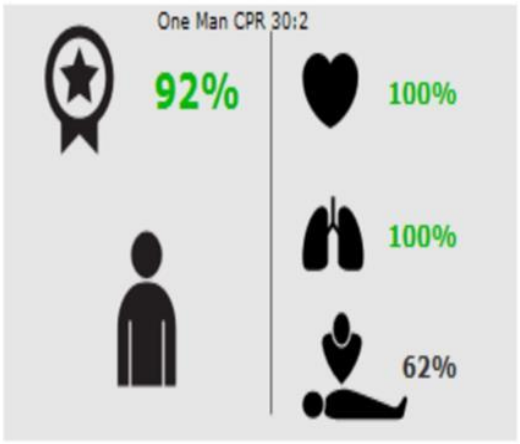
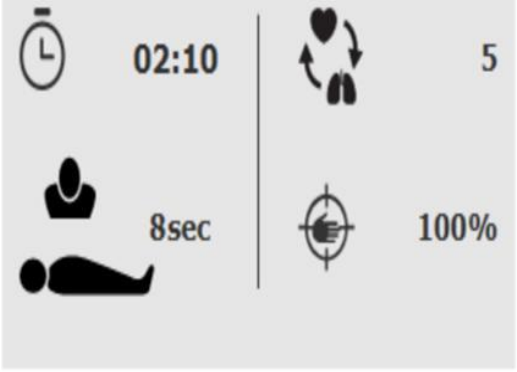
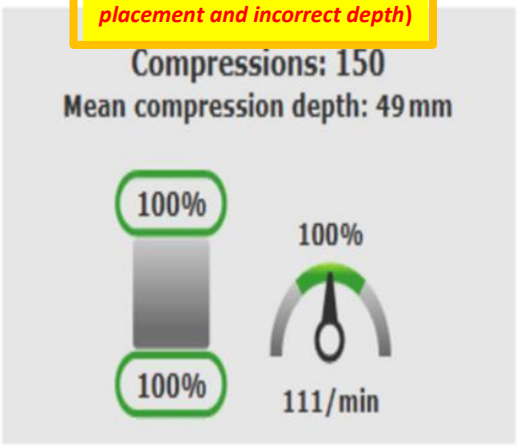


Duration from 1st compression to last ventilations within 130 seconds

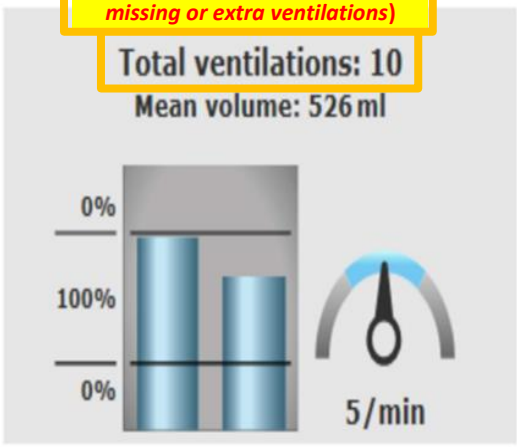


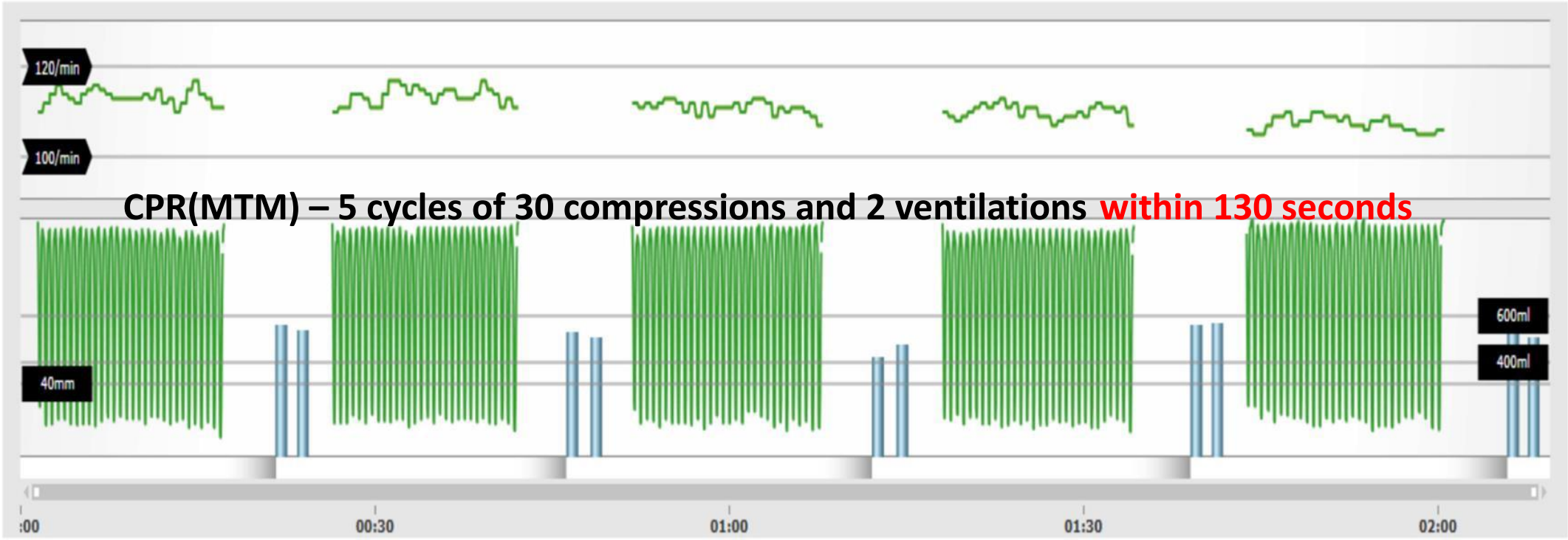
5 cycles of 30 compressions and 2 ventilations

Up to 30 errors allowed based on 150 compressions (*incomplete chest recoil, incorrect hand placement and incorrect depth*)



Up to 5 errors allowed based on 10 ventilations (*insufficient volume or missing or extra ventilations*)





When to stop CPR? (Asked by instructor) – Paramedics take over, AED Analysing heart rhythm or casualty wakes up

AED testing will commence after the 2 minutes of one-man CPR. When testing CPR and AED, participants must do the actual compressions and ventilations as if they are doing the one–man CPR.

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SUMMARY: DIFFERENCE BETWEEN ADULT, CHILD AND INFANT-ONE-RESCUER CPR

CPR Sequence	**Adult and Older Child**	**Child (1-12 Years of Age)**	**Infant (Less than 1 Year of Age)**
Check **D**anger Establish **R**esponsiveness	Tap on casualty's shoulders firmly; Shout "Hello! Hello! Are you OK?"		
Activate EMS	Immediately **S**hout Loudly: Call "995" for emergency ambulance		
Get **A**ED	✓ If there is another person around ✓ If alone, only get AED if it is visible and nearby		
Recognition of Cardiac Arrest	Check for normal breathing (gasping is not normal breathing)		
Pulse Check (for Trained Healthcare Providers Only)	**Carotid**		**Brachial**
Start Chest Compressions	If breathing and pulse are absent or if you are unsure about its presence, start chest compressions and perform 5 cycles of CPR (30 : 2)		

Compression Landmarks	Lower half of sternum		Lower half of sternum (Just below intermammary line)
Compression Methods	Heel of 1 hand, other on top		2 Fingers
Compression Depth	4 to 6 cm	4 - 5 cm	3 - 4 cm
Compression Rate	100 to 120 / minutes		
Compression : Ventilation Ratio	30:2		
Breathing	2 breaths at 1 second per breath. The two breaths should not take more than 2 seconds.		

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Acknowledgement

Singapore Resuscitation and First Aid Council (SRFAC)

BCLS + AED (E-Book) Rev 1 / 2018 (SRFAC)

CPR+AED INSTRUCTORS' TRAINING COURSE MANUAL (NRC) Rev 2 / 2013

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BCLS+AED INSTRUCTOR TRAINEE ASSESSMENT FORM

Name of Trainee Instructor: _____

NRIC No: _____ Organisation/Department: _____

Date of BCLS Instructor Course Attended: _____

To indicate the grading in the boxes: (P) Poor, (F) Fair, (G) Good, (E) Excellent

No	Teaching Qualities	1st Assessment Date:	2nd Assessment Date:
1.	Overall Knowledge		
2.	Demonstration Skills		
3.	Questioning Skills		
4.	Communication Skills		
5.	Coaching Skills		
6.	Ability to handle questions		
7.	Practical Teaching		
8.	Practical Testing		
9.	Manikin Maintenance & Troubleshooting		
10.	Rapport with Trainees		
11.	Time Management		
12.	Graph Interpretation		
	Final Assessment (To Circle Pass or Fail)	Pass / Fail	Pass / Fail
	Name of Assessor:		
	Assessor's Signature:		

Comments:

Assessment 1

_____

_____

Assessment 2

_____

_____

Trainee Attachment Completed at: _____

Name of Coordinator & Contact Number of Training Centre: _____

All forms submitted to NDU should be duly completed. Assessment form must be endorsed with the Training Centre stamp or accompanied by an official cover letter from the Training Centre. All incomplete forms will be rejected

SAMPLE