Clinical Skills in Hospitals Project

Basic Life Support (BLS) paediatric

Module 1: Airway, Breathing and Chest Compression (ABC)

Module 2: Automatic External Defibrillator (AED)

Module 3: Paediatric BLS 1

Module 4: Paediatric BLS 2

Module 5: Complex paediatric BLS

StV

State Government Victoria

Clinical Skills in Hospitals Project

Basic Life Support (BLS) paediatric

Module 1: Airway, Breathing and Chest Compression (ABC)

Module 2: Automatic External Defibrillator (AED)

Module 3: Paediatric BLS 1

Module 4: Paediatric BLS 2

Module 5: Complex paediatric BLS

Acknowledgments

The authors wish to acknowledge the following people for their important contributions to this project:

- Dr Nicole Shilkofski, from Johns Hopkins Hospital, Maryland, USA, and Mr Julian Van Dijk and Dr Robert O'Brien from St Vincent's Hospital, Melbourne, for their tireless efforts as the primary authors of the basic life support (paediatric) package.
- Dr Stuart Dilley at St Vincent's Education Centre for his contributions to this package.

For further information please contact the project manager, Julian Van Dijk:

(03) 9288 2900
julian.vandijk@svhm.org.au

Preface

In 2007 the Department of Human Services commissioned St Vincent's Hospital Melbourne, to design and develop simulation-based training packages for clinical skills trainers in Victorian hospitals.

The project provides Victorian health professionals—specifically, hospital clinical educators—with a resource to deliver simulation-based clinical skills training.

The information in this manual complements current training programs and should be considered as a resource in the workplace, rather than the definitive resource on the topic.

Every effort has been made to provide the most current literature references. Authors have consulted other health professionals and current programs when possible in development to ensure that the modules produced in this package are consistent with current health practices.

Course delivery in condensed form

Sample timetable for one-day workshop

This is an example of how the modules in *BLS paediatric* could be combined into a one-day workshop. A sample timetable is provided for a course consisting of Modules 1, 2 and 3, and a course consisting of Modules 3, 4 and 5.

Course 1 (Modules 1, 2 and 3)

Timing	Activity		Objective
8.30 to 8.45	Introduction to faculty and participants		
8.45 to 9.30	Facilitated discussion		Module 1: 1, 2 and 3
9.30 to 10.30	Skills stations (three): ■ airway management ■ bag-mask ventilation ■ chest compressions		Module 1: 4, 5 and 6
10.30 to 10.40	Summary of main points from Module 1		Module 1: all
10.40 to 10.50	Morning tea		
10.50 to 11.30	Facilitated discussion—AED		Module 2: 1 and 2
11.30 to 12.15	Skills station: practice of AED		Module 2: 2, 3 and 4
12.15 to 12.30	Summary of main points from Module 2		Module 2: all
12.30 to 1.15	Lunch		
1.15 to 1.45	Introduction to simulation		Module 3: 1
	Group 1	Group 2	
1.45 to 2.00	Simulation 1	Simulation 2	Module 3: all
2.00 to 2.30	Debrief	Debrief	Module 3: all
2.30 to 2.45	Simulation 2	Simulation 1	Module 3: all
2.45 to 3.15	Debrief	Debrief	Module 3: all
3.15 to 3.30	Afternoon tea		
3.30 to 4.00	Summary of main points from Module 3 Course evaluation		Module 3: all

Course 2 (Modules 3, 4 and 5)

Timing	Activity		Objective
8.30 to 9.15	Introduction and review of BLS		Module 3: 1
9.15 to 9.30	Introduction to simulation		
	Group 1	Group 2	
9.30 to 9.45	Simulation 1	Simulation 2	Module 3: all
9.45 to 10.30	Debrief	Debrief	Module 3: all
10.30 to 10.45	Morning tea		
10.45 to 11.00	Simulation 2	Simulation 1	Module 3: all
11.00 to 11.30	Debrief	Debrief	Module 3: all
11.30 to 12.00	Summary of Module 3		Module 3: all
12.00 to 12.30	Lunch		
12.30 to 1.00	Facilitated discussion—Module 4		Module 4: 1
1.00 to 1.15	Simulation 1	Simulation 2	Module 4: all
1.15 to 1.45	Debrief	Debrief	Module 4: all
1.45 to 2.00	Simulation 2	Simulation 1	Module 4: all
2.00 to 2.30	Debrief	Debrief	Module 4: all
2.30 to 2.45	Summary of Module 4		Module 4: all
2.45 to 3.00	Afternoon tea		
3.00 to 3.45	Facilitated discussion—team behaviours		Module 5: 1
3.45 to 4.00	Simulation 1	Simulation 2	Module 5: 2, 3 and 4
4.00 to 4.30	Debrief	Debrief	
4.30 to 4.45	Simulation 2	Simulation 1	Module 5: 2, 3 and 4
4.45 to 5.15	Debrief	Debrief	
5.15 to 5.30	Summary of Module 5 Course evaluation		

Basic Life Support (BLS) paediatric

Introduction

BLS paediatric (basic life support) was developed as a teaching and learning tool for Victorian clinical educators. The information contained in each module was developed using evidence-based resources and examples of best practice. Where expert opinion varies, a discussion section is included. However, it is not within the scope of ALS paediatric to address the full spectrum of local variations. Variations can occur in several areas, including practices relating to types of equipment used, infection control processes, practice guidelines and so on. Therefore, educators should, where appropriate, adapt content to reflect their local policies, procedures and protocols. This will ensure the relevancy of the package content to your learners.

The modules are designed to be discrete courses in their own right. They are timetabled so they can be completed in a 1–2 hour timeframe. This timeframe was chosen after we received feedback from clinical educators requesting shorter courses, because health professionals often have limited time to educate away from patients. However, the packages may also be combined into a one- or two-day course, as described in the Module Outline.

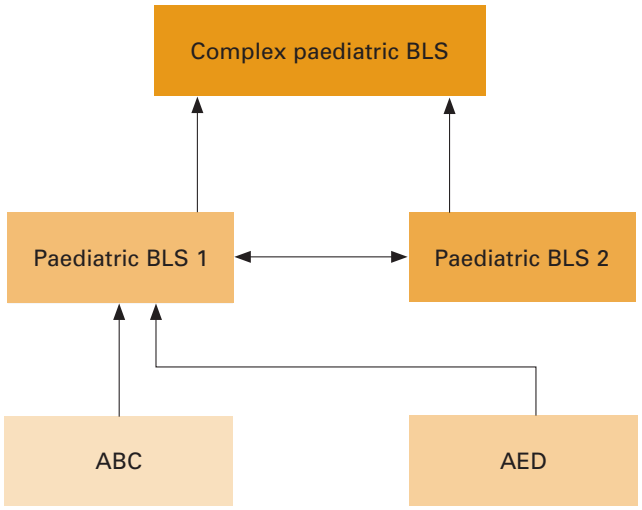
BLS paediatric should be used as an educational tool to assist in the teaching of clinical skills. It is structured as a guide to assist clinical educators, and uses many concepts taught in the *Clinical Skills in Hospitals Project* (Train-the-Trainer courses). Educators are encouraged to build on this resource by adding their own scenarios which incorporate hospital/health service protocols, policies and other resources. Each module is designed as a lesson plan to incorporate the simulations into the teaching of clinical skills.

Aims

BLS paediatric aims to make participants confident in their application of basic life support knowledge and skills on children in different environments and settings.

Package structure

BLS paediatric contains five modules which provide learning opportunities for health professionals at all levels of experience and from all health disciplines. Modules 1 and 2 are regarded as fundamental. Modules 3 and 4 are more difficult, and are regarded as intermediate. Module 5 is more advanced and regarded as complex.

Level of complexity	Package structure
Complex For participants with more than 4 years experience or who have completed Modules 1–4	
Intermediate For participants in postgraduate years 3–4 or who have completed Modules 1 and 2	
Fundamental For participants in postgraduate years 1–2	

These modules were designed to develop participants' knowledge, skills and behaviours in BLS and to expose them to increasingly complex scenarios aimed at testing their ability to combine these individual skills, work as a team and problem solve in more difficult situations.

Educators delivering these modules should be aware of participants' level of experience and choose appropriate modules. Modules presume an increasing level of knowledge as they progress, ranging from a fundamental knowledge of anatomy and physiology for the fundamental modules, up to detailed knowledge of BLS and resuscitation for the complex modules. Novice participants (such as first-year graduates) are expected to start with the fundamental modules, and only move onto intermediate and more complex modules as they demonstrate proficiency. More experienced participants may start at the intermediate level if the educator is satisfied that they have the prior knowledge and skills. Individual educators are responsible for assessing participants' baseline knowledge and determining which modules they need to complete. More specific descriptions of presumed knowledge are outlined in each module.

The design of these packages presumes that the clinical educators using them have knowledge and expertise in current best practice regarding the teaching of clinical skills and conducting facilitated discussions. Knowledge and expertise are presumed commensurate with the Department of Human Services' basic and advanced Train-the-Trainer Programs. Clinical educators are encouraged to refer to the Department of Human Services' *Clinical Skills Facilitators Manual* for theory on:

1. Peyton's model for teaching clinical skills
2. leading small group discussions
3. giving feedback
4. crisis resource management skills.

Module 1: Airway, Breathing and Chest Compression (ABC)

Introduction

BLS paediatric (basic life support) was developed as a teaching and learning tool for Victorian clinical educators. The information contained in each module was developed using evidence-based resources and examples of best practice. Where expert opinion varies, a discussion section is included. However, it is not within the scope of ALS paediatric to address the full spectrum of local variations. Variations can occur in several areas, including practices relating to types of equipment used, infection control processes, practice guidelines and so on. Therefore, educators should, where appropriate, adapt content to reflect their local policies, procedures and protocols. This will ensure the relevancy of the package content to your learners.

The modules are designed to be discrete courses in their own right. They are timetabled so they can be completed in a 1–2 hour timeframe. This timeframe was chosen after we received feedback from clinical educators requesting shorter courses, because health professionals often have limited time to educate away from patients. However, the packages may also be combined into a one- or two-day course, as described in the Module Outline.

BLS paediatric should be used as an educational tool to assist in the teaching of clinical skills. It is structured as a guide to assist clinical educators, and uses many concepts taught in the *Clinical Skills in Hospitals Project* (Train-the-Trainer courses). Educators are encouraged to build on this resource by adding their own scenarios which incorporate hospital/health service protocols, policies and other resources. Each module is designed as a lesson plan to incorporate the simulations into the teaching of clinical skills.

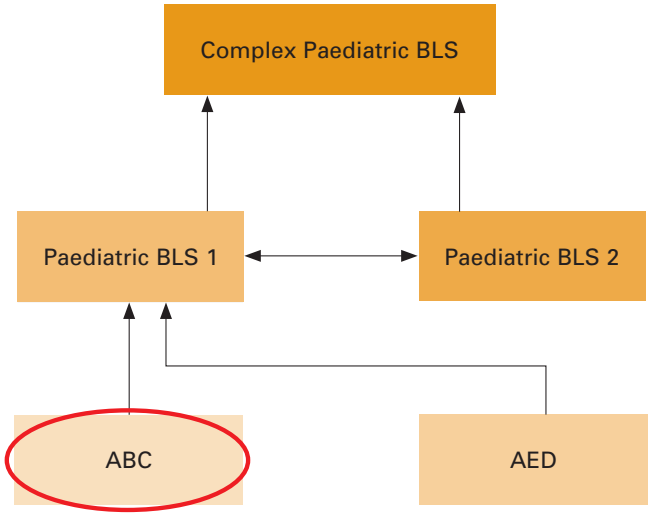
Aims

BLS paediatric aims to make participants confident in their application of basic life support knowledge and skills on children in different environments and settings.

Package structure

BLS paediatric contains five modules which provide learning opportunities for health professionals at all levels of experience and from all health disciplines. Modules 1 and 2 are regarded as fundamental. Modules 3 and 4 are more difficult, and are regarded as intermediate. Module 5 is more advanced and regarded as complex.

Level of complexity	Package structure
Complex For participants with more than 4 years experience or who have completed Modules 1–4	
Intermediate For participants in postgraduate years 3–4 or who have completed Modules 1 and 2	
Fundamental For participants in postgraduate years 1–2	



These modules were designed to develop participants' knowledge, skills and behaviours in BLS and to expose them to increasingly complex scenarios aimed at testing their ability to combine these individual skills, work as a team and problem solve in more difficult situations.

Educators delivering these modules should be aware of participants' level of experience and choose appropriate modules. Modules presume an increasing level of knowledge as they progress, ranging from a fundamental knowledge of anatomy and physiology for the fundamental modules, up to detailed knowledge of BLS and resuscitation for the complex modules. Novice participants (such as first-year graduates) are expected to start with the fundamental modules, and only move onto intermediate and more complex modules as they demonstrate proficiency. More experienced participants may start at the intermediate level if the educator is satisfied that they have the prior knowledge and skills. Individual educators are responsible for assessing participants' baseline knowledge and determining which modules they need to complete. More specific descriptions of presumed knowledge are outlined in each module.

The design of these packages presumes that the clinical educators using them have knowledge and expertise in current best practice regarding the teaching of clinical skills and conducting facilitated discussions. Knowledge and expertise are presumed commensurate with the Department of Human Services' basic and advanced Train-the-Trainer Programs. Clinical educators are encouraged to refer to the Department of Human Services' *Clinical Skills Facilitators Manual* for theory on:

1. Peyton's model for teaching clinical skills
2. leading small group discussions
3. giving feedback
4. crisis resource management skills.

Module 1: Airway, Breathing and Chest Compression (ABC)

Authors: Dr Nicole Shilkofski, Dr Robert O'Brien, Mr Julian Van Dijk

Definition

For the purposes of these modules, a 'child' is defined as approximately 1–8 years of age and an infant is less than approximately 1 year of age. These modules do not deal with newborn infants or neonates (under 28 days old).

Aims

The purpose of *BLS paediatric—Module 1: ABC* is to teach, or refresh participants' knowledge of, paediatric basic life support (airway, breathing and chest compression) clinical skills.

Presumed knowledge

This module is targeted to health professionals with little or no experience in basic life support. However, they are expected to understand the differences between adult and child anatomy, that different BLS techniques are required for children and have a basic knowledge of:

1. paediatric airway anatomy: mouth, tongue, mandible, pharynx and larynx
2. cardiovascular anatomy: heart, peripheral pulses
3. respiratory physiology: breath sounds, ventilation cycle
4. cardiovascular physiology: blood pressure, circulation.

Objectives

By the end of this module, participants should have:

1. reviewed the Australian Resuscitation Council Guidelines BLS (paediatric)
2. identified the indications for initiating paediatric basic life support
3. analysed the process by which paediatric resuscitation efforts are escalated for children within their own work environment or institution
4. identified anatomical and physiologic differences between children and adults that affect guidelines for basic life support for paediatrics
5. practised basic airway manoeuvre techniques on infant and child manikins
6. practised rescue breathing on infant and child manikins
7. practised external cardiac compressions on infant and child manikins.

Background information for educators

Airway[1]

Death due to airway obstruction is rapid, but easily preventable. The airway may become obstructed by foreign bodes, including secretions and food, or from the patient's own anatomical structures, usually the tongue. In the unconscious patient,

muscle tone and cough reflexes are reduced or absent, putting them at risk of airway obstruction. In children, hypotonia and neuromuscular disease can also contribute to obstruction. Obstruction may be partial or complete, and may progress rapidly from one to the other. Obstruction by the tongue is the most common form of obstruction of the paediatric airway. Positioning the paediatric patient is particularly important (the 'sniffing position') to relieve or prevent obstruction, due to the large occiput of the infant and young child in relation to the child's body surface area. In the prone position, the paediatric occiput can flex the neck and obstruct the airway. The trachea is soft and pliable, and can be distorted by excessive backward head tilt or jaw thrust.

Paediatric airway management is indicated when:

1. the patient is semiconscious or unconscious, or unable to protect the airway
2. the patient has an obstructed airway
3. rescue breathing is required
4. in situations of cardiopulmonary arrest when the patient is apnoeic and pulseless.

Patients who have collapsed and fallen to the ground from a standing position are unlikely to have sustained a significant neck injury. However, patients who struck their head on an object as they fell, or who are unconscious due to significant trauma (for example, motor vehicle accident, fall from height) are at greater risk of cervical spine injury. Consider potential cervical spine injury in these patients. Immobilise the cervical spine with a cervical collar (or other means until a collar is available), and select airway manoeuvres accordingly. However, airway management takes precedence over possible cervical spine injury. If a paediatric cervical collar is unavailable, stabilise the neck using towels, blankets or a pillow to prevent mobility.

Indications of an obstructed airway in a patient who attempts to breathe include:

1. paradoxical movement of the chest wall
2. noisy breathing, stridor, gurgling
3. cyanosis
4. use of accessory muscles to breathe (substernal, supraclavicular or intercostal retractions, or use of sternocleidomastoid muscles).

In patients who are not breathing or attempting to breathe, airway obstruction may not become evident until attempts at rescue breathing commence.

The mouth and upper airway should be inspected for secretions and foreign bodies that might contribute to airway obstruction. Such obstruction may be relieved by these steps:

1. Turn the patient on their side to drain secretions (recovery position).
2. Use suction if available.
3. Manually remove solid foreign bodies with fingers *only if it is visualised.* Do not perform a blind finger sweep because this can worsen obstructions due to the small airway in children.

Figure 1: Airway inspection and then visualised finger sweep

After removal of foreign bodies from the mouth and upper airway, the head tilt/chin lift method is most commonly used to maintain the airway. Lifting the chin lifts the tongue off the posterior pharyngeal wall by lifting the mandible forward. The rescuer should:

1. Position themselves at the side of the patient's head.
2. Place one hand on the patient's forehead.
3. Use the thumb and fingers of the other hand to lift the patient's chin.
4. Tilt the head (not the neck) backwards. Avoid hyperextension of the neck, which may cause airway obstruction in small infants.

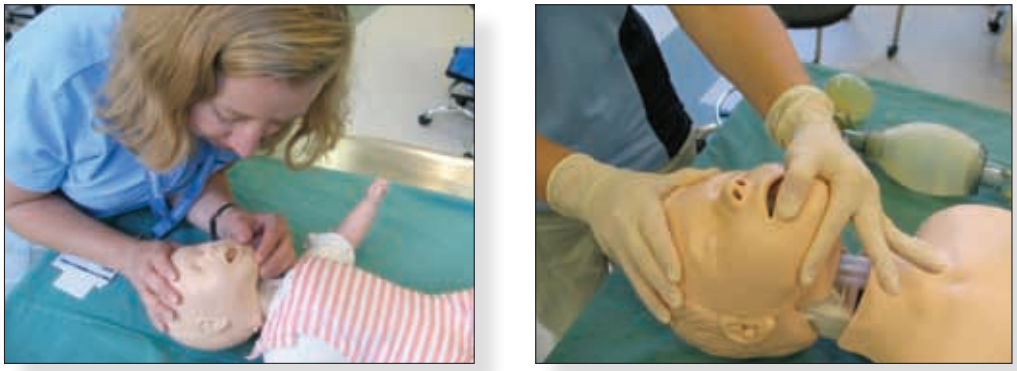


Figure 2: Head tilt/chin lift for both infant and child

Alternatively, use the jaw thrust method. This technique should be used where cervical spine injury is suspected, or in cases of trauma, but can be used on any patient. The rescuer should:

1. Position themselves at the top of the patient's head.
2. Place their fingers behind the angle of the mandible on both sides.
3. Exert pressure with the fingers to thrust the mandible upwards, moving the tongue away from the posterior pharyngeal wall.
4. Use the thumbs to keep the mouth open.

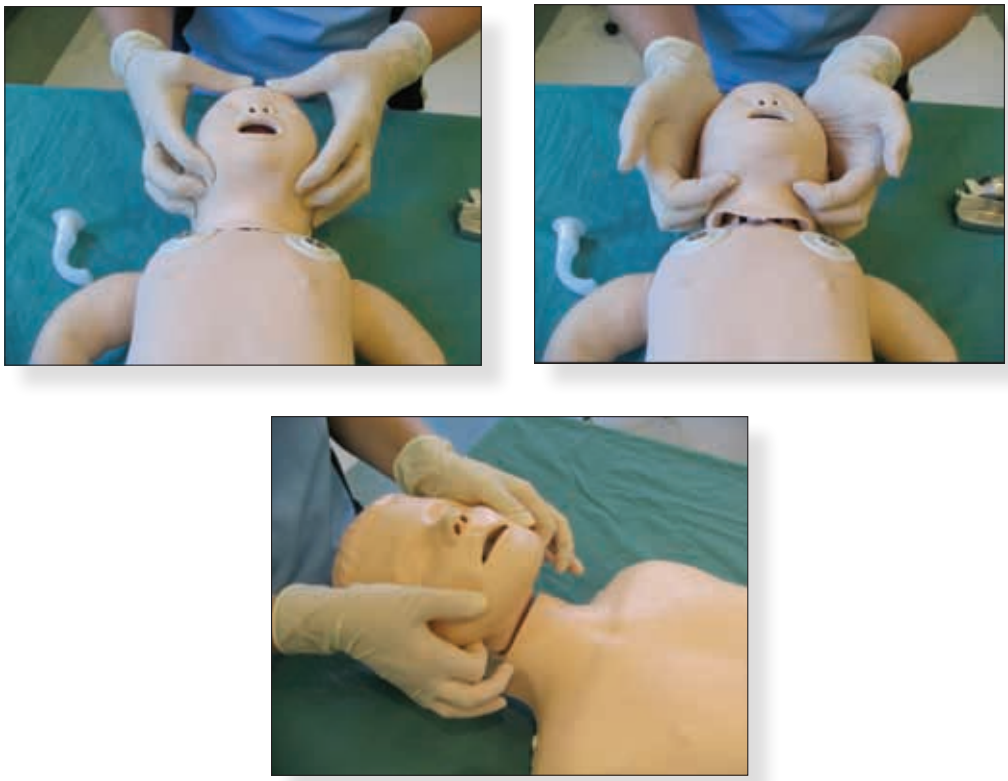


Figure 3: Jaw thrust for both infant and child

Oropharyngeal (Guedel) and nasopharyngeal airways are simple devices which can help obtain and maintain an airway. Size and insert oral airways as follows:

1. Measure from the centre of the lips to the angle of the mandible for appropriate length.
2. In children, it is helpful to use a tongue depressor to assist in opening the mouth/jaw and inserting the Guedel airway in under direct visualisation.
3. If a tongue depressor is not readily available, use another method of insertion:
4. First insert the oropharyngeal airway upside-down.
5. Rotate it 180 degrees as the device is introduced further into the mouth.
6. This can cause damage to the mucosal membranes of the hard palate in young infants or patients with friable mucosa. In these cases, a tongue depressor and the direct visualisation method are recommended.

Figure 4: Correct infant oropharyngeal size measurement and tongue depressor assisted insertion

Figure 5: Alternative oropharyngeal insertion technique in a child

Nasopharyngeal airways are sized in a similar manner: measuring from the tip of the nose to the tragus of the ear to estimate the appropriate length. These should be well lubricated and gently slid into the nose until the flange rests against the external nares. The diameter of a child's fifth fingertip, or that of an age-appropriate endotracheal tube, is an estimate of the diameter size of nasopharyngeal airway required.

Figure 6: Correct nasopharyngeal size measurement

Breathing[2]

Once the unconscious patient's airway is cleared, the rescuer should check whether the patient is breathing, but take no more than 10 seconds to do so. The rescuer should:

1. Look and feel for chest and abdominal movement.
2. Look and feel for air movement from the mouth and nose.

If adequate breathing is present, roll the patient on their side (recovery position), maintaining an open airway and preventing aspiration. Stay with the patient and regularly check for breathing and pulse until help arrives. Periodic gasping (agonal gasps) is not breathing.

If the unconscious patient is not breathing after the airway is opened, commence rescue breathing. This involves:

1. Two initial breaths, allowing one second per inspiration.
2. Check for signs of life (unconscious, unresponsive, not moving, not breathing normally).
3. If signs of life are absent, commence chest compressions at the rate of 100 per minute.
4. Continue chest compressions and rescue breathing at a ratio of 30:2 (for paediatric BLS providers, the ideal with two health care rescuers is a ratio of 15:2).

The technique of rescue breathing depends somewhat on the equipment available to the rescuer. Mask-to-mask ventilation has an advantage over mouth-to-mouth ventilation in that a barrier exists between patient and rescuer, affording some protection against infectious disease and cross-contamination. Bag-mask ventilation is superior again, because it also allows the rescuer to provide supplemental oxygen when this is available.

For mouth-to-mouth rescue breathing, the rescuer should:

1. Position themselves at the side of the patient's head.
2. Obtain and maintain an open airway as described above.
3. Slightly open the patient's mouth and pinch the child's nose. In an infant, attempt mouth-to-mouth-and-nose breathing. If you have difficulty making an effective seal over mouth and nose, try either mouth-to-mouth or mouth-to-nose ventilation.
4. Take a breath and blow adequate air into the patient's lungs to cause the chest to rise. The inspiratory time with mouth techniques should be approximately one second.
5. Look for a rise of the patient's chest to indicate movement of air into the lungs.
6. Remove mouth from the patient to allow escape of air.
7. Turn head to observe the patient's chest falling and feel the exhaled air.

Figure 7: Mouth–to–mouth breathing for both infant and child

For mouth-to-mask rescue breathing, the rescuer should:

1. Position themselves at the patient's head.
2. Obtain and maintain an open airway.
3. Place the narrow end of the mask over the bridge of the nose.
4. Use two hands to hold the mask.
5. Push down firmly on the mask with thumbs and fingers, while simultaneously lifting the jaw into the mask to create a seal. The mask must be appropriately sized for a child to create an adequate seal.
6. Blow air into the patient's lungs by blowing through the mouthpiece of the mask.
7. Look for a rise in the patient's chest.
8. Remove mouth from mask to allow exhalation.
9. Look for falling of the chest wall and feel for exhaled air.

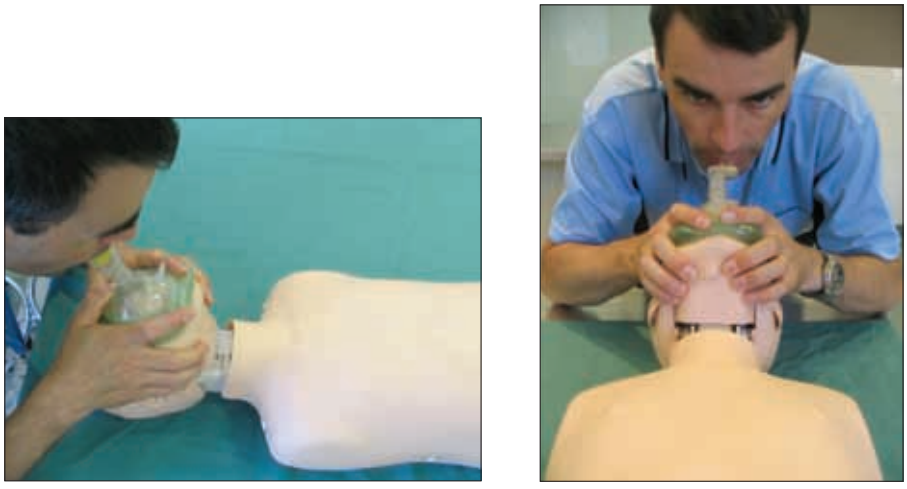


Figure 8: Mask-to-mouth viewing chest rise and fall

Most health professionals in the hospital setting favour a bag-mask device for rescue breathing. Responders should be familiar with the parts of such a device and the sizes of bag-masks available for children compared to adults and adolescents. Choice of size should depend on the ventilation bag necessary to deliver adequate tidal volume to the patient (at least 450–500 mL bag):

1. facemask
2. valve
3. pressure relief valve
4. ventilation bag
5. oxygen inlet connection
6. oxygen reservoir bag (flow of 10–15 litres per minute for a paediatric bag).

For bag-mask rescue breathing, the rescuer should:

1. Position themselves at the patient's head.
2. Connect the bag-mask device to maximal oxygen flow if available.
3. Obtain and maintain an open airway.
4. Place the narrow end of the mask over the bridge of the nose.
5. Push firmly on the mask with thumb and index finger, while simultaneously lifting the jaw into the mask to create a seal. Take precautions that the other fingers holding the mask do not rest on the submandibular soft tissue, because this can obstruct the paediatric airway.
6. Hold the mask firmly in position with one hand
7. Blow air into the patient's lungs by compressing the ventilation bag.
8. Look for a rise in the patient's chest.
9. Allow for expiration, observing for fall of the chest wall.
10. Two hands may be required to hold the mask in place, in which case, a second person may be employed to compress the ventilation bag.

Figure 9: Correct placement of mask for infant single operator technique for infant (over the nose to chin)

Figure 10: Correct placement of mask for child (over the nose to chin)

Circulation[3]

Chest compressions are a vital part of resuscitation attempts. Some studies suggest that resuscitation with chest compression alone may be as good as traditional resuscitation inclusive of rescue breathing[4].

Rescuers should start chest compressions if no signs of life are apparent (unconscious, unresponsive, not moving, not breathing normally). If, despite oxygenation and ventilation of the child, the pulse is < 60 beats per minute, and signs of poor perfusion are present (pallor, cyanosis), begin chest compressions. Profound bradycardia in the presence of poor perfusion is an indication for compressions, because it signals that cardiac arrest is imminent. *Cardiac output in infancy and childhood largely depends on heart rate*. Prolonged attempts at trying to detect a pulse should not occur—in the past this has delayed initiation of chest compressions. If the pulse is palpated, it should be the brachial pulse in an infant, and carotid or femoral (central) pulse in a child.

Figure 11: Brachial pulse check

Some guidelines suggest that a precordial thump might be useful before initiation of chest compressions if the onset of ventricular fibrillation is observed or thought to be of very recent onset, although its efficacy in children is not proven. The Australian Resuscitation Council (ARC) and International Liaison Committee on Resuscitation (ILCOR) guidelines for paediatric BLS recommend that a precordial thump 'should be considered within the first 15 seconds of a monitored arrest if a defibrillator is not immediately available'5, 6. To deliver a precordial thump, the rescuer should:

1. Make a clenched fist 25–30 cm above the patient's chest.
2. Strike the patient sharply in the mid-sternum with the side of the fist.

Figure 12: Precordial Thump

Proper technique for chest compression is important and age-dependent in children. For *adolescents and children older than 1 year:*

1. Position the hands on the lower half of the sternum—that is, the lower half of the chest in the midline.
2. The heel of the hand exerts pressure on the lower sternum with the fingers parallel to the ribs and lifted off the chest wall.
3. The rescuer's arms should be straight, with the elbows locked in extension.
4. The rescuer's shoulders should be directly above the sternum.
5. The rescuer's upper body—not their arms—exerts compression force.
6. The lower half of the sternum should be depressed by one-third of the depth of the chest (approximately 4–5 cm in an adolescent/adult).
7. Chest compressions should be delivered at a rate of 100 per minute.
8. In young children, compressions can be performed with the 'heel' of one hand, or by using the two-handed technique. In older children, the two-handed compression technique should be used, as for adults.

Continue chest compressions and rescue breathing at a ratio of 30:2 in basic life support rescue by one or two rescuers. In advanced life support rescue, with two health care rescuers, the ratio changes for infants and children up to puberty to a ratio of 15:2.

For *infants less than 1 year*, chest compressions can be performed using the two-finger technique with the pulp of the fingers in the centre of the nipple line, or using the two-thumb technique. In the latter, the rescuer's hands encircle the chest, and thumbs compress the sternum. This is the superior technique, but care is required to avoid restricting chest expansion during inspiration. The two-finger technique remains acceptable, and may be used by a single rescuer in order to minimise transition time between chest compressions and ventilation. With either technique, the depth of compression should be approximately one-third the depth of the chest. The ratio of compressions to ventilations is 30:2 for basic life support rescue in infants, or 15:2 for paediatric ALS with two health care rescuers.

Figure 13: Infant two-thumb technique

Figure 14: Infant two-finger technique

Figure 15: Correct hand and body position for a child

Learning activities

Suggested learning activities and timetable are outlined below.

Timing	Activity	Objective
40 minutes	Facilitated discussion	1, 2, 3 and 4
60 minutes	Skills stations (three): ■ airway management—infant and child ■ bag-mask ventilation—infant and child ■ chest compressions—infant and child	 5 6 7
10 minutes	Summary	All
10 minutes	Evaluation	

Total time = 2 hours

Facilitated discussion

The facilitator should lead a discussion amongst participants about the issues covered in the background information. The facilitator should not give a didactic lecture, but instead promote open discussion and knowledge sharing amongst participants. Participants should be encouraged to describe any real-life experiences they have encountered.

Essential topics to be covered in facilitated discussion include:

- definitions of neonate, infant and child for the purposes of paediatric BLS
- the differences in paediatric airway anatomy from adult anatomy, and their implications for in BLS techniques for children
- the aetiology of respiratory and cardiac arrests in children (highlighting the likelihood of cardiac arrest as secondary to respiratory compromise in most children)
- indications for paediatric BLS initiation
- basic airway manoeuvres and chest compression techniques for infants compared to children
- the process by which paediatric resuscitation efforts are commenced in your hospital's work environment, and how to activate a call for help to obtain paediatric expertise.

Skills stations

The skills stations allow participants to practise their basic life support skills (airway, breathing and chest compressions) on age-appropriate infant and child models, while receiving feedback in a structured format from peers and/or facilitators.

The program and resources required assume three facilitators for every 12 participants, a ratio of 1:4. Each facilitator should have access to one manikin suitable for teaching airway, breathing and chest compression skills on a child, as well as one manikin suitable for teaching these skills on an infant (for example, Little Junior or similar, and Baby Anne or similar). A second paediatric airway manikin is desirable, to allow participants not directly being instructed or observed to practise before or after their turn.

Participants should be guided through the three BLS skills (airway, ventilation, chest compressions) using Peyton's four-step model on each of the two manikins, emphasising differences in technique between children and infants under 1 year[9]. Feedback should be provided at the completion of the skill. Each participant should spend 20 minutes on airway, 20 minutes on breathing and 10 minutes on chest compressions (the time should be divided between each manikin—infant and child).

Summary

The summary session reinforces content covered in the learning activities, and is an opportunity for participants to reflect on what they have covered. No new material should be introduced.

Important points to include in the summary are:

- differences in paediatric airway anatomy, compared with adult anatomy
- the most common aetiology of paediatric arrest (that is, respiratory arrest due to airway obstruction)
- the importance of a compression-to-ventilation ratio of 30:2, and rate of compressions at 100 per minute
- the importance of a depth of compressions at one-third the depth of the chest (approximately 4–5 cm in an adolescent/adult).
- the importance of a initiation of chest compressions for 'no signs of life', rather than lack of pulse.

Resource list

The following resource list assumes three facilitators for every 12 participants, a ratio of 1:4. As a minimum, the following resources are needed to conduct this module.

Resource	Quantity	Additional comments
Facilitators	3	Allows 1:4 ratio with 12 participants
PowerPoint presentation	1	Provided in module
ARC paediatric BLS flowchart	1	Also provide as handout for participants
ARC Guidelines 4, 5, 6, 7, 12.1 and 12.2, February 2006	1	For educator's reference as needed
Hospital BLS protocol	1	If different from ARC Guidelines Provide as handout for participants
Infant manikins	3	Manikins should be suitable for airway management (insertion of Guedel airway and nasopharyngeal airway) and ventilation (appropriate for lung inflation) as well as chest compressions
Child manikins	3	Manikins should be suitable for airway management, ventilation and chest compressions, as above
Oropharyngeal airways	3 sets	Include at least three different sizes
Nasopharyngeal airways	3 sets	Include at least three different sizes
Lubricant	3	
Bag-mask ventilation devices—paediatric and adolescent/adult	3	Include oxygen tubing
Ventilation mask	3 sets	Include at least three different sizes
Oxygen supply	3	Three wall outlets or three oxygen
Evaluation forms	12	One for each participant
Feedback sheets	3	As a prompt for each facilitator

Evaluation

A formal evaluation has been specifically developed for this module. It incorporates the objectives of the module and the perceptions of the participants about whether they have increased their understanding by working through the module. It is highly recommended that this formal evaluation be copied and completed by all participants at the completion of the module.

A range of informal evaluation tools may also be used in conjunction with this evaluation throughout the module, including those available in the Department of Human Services' *Clinical Skills Facilitators Manual* from the basic course conducted in 2007.

References

1. Australian Resuscitation Council, Guideline 4: Airway. February 2006
2. Australian Resuscitation Council, Guideline 5: Breathing. February 2006
3. Australian Resuscitation Council, Guideline 6: Compressions. February 2006
4. Australian Resuscitation Council, Guideline 7: Cardiopulmonary Resuscitation. February 2006
5. Australian Resuscitation Council, Guideline 11.3: Precordial Thump and Fist Pacing. February 2006
6. Australian Resuscitation Council, Guideline 12.1: Introduction to Paediatric Advanced Life Support. February 2006
7. Australian Resuscitation Council, Guideline 12.2: Advanced Life Support for Infants and Children, Diagnosis and Management. February 2006
8. International Liaison Committee on Resuscitation 2006 Consensus on Science with Treatment Recommendations for Pediatric and Neonatal Patients: Pediatric Basic and Advanced Life Support. *Pediatrics* 117: E955–E977
9. Peyton J. 1998 *Teaching and Learning in Medical Practice*. Manticore Europe Ltd, Great Britain

Resources

Facilitator feedback form

The following form should be used to assist you in giving feedback after each participant has practised their BLS skills at the skill station.

Feedback using the Pendleton model

Pendleton's model of feedback assists learners to maximize their potential at different stages of training, raise their awareness of strengths and areas for improvement, and identify actions to be taken to improve performance. Pendleton's rules are structured in such a way that the learner identifies the positives first, in order to create a safe environment. This is followed by the facilitator or group reinforcing these positives and discussing skills to achieve them. Different techniques are then suggested. The advantage of this method is that the learner's strengths are discussed first. Avoiding a discussion of weaknesses right at the beginning prevents defensiveness and allows reflective behaviour in the learner.

Below is a series of questions to assist you in this technique:

1. Ask the learner how they feel.
2. Ask the learner what went well and why (this can be combined with question 1 and 3).
3. Tell the learner what went well and why.
4. Ask the learner what could have been done better and why.
5. Tell the learner what could have been done better and why.
6. Summarise the learner's strengths and identify up to three things to concentrate on.

Note: This form does not need to be given to the participant — it is a guide for you, the group facilitator.

Module 1: Airway, Breathing and Chest Compression (ABC)—evaluation

Thank you for participating in this module. As part of our commitment to quality improvement the following questionnaire will be used to plan future implementation of this module. We appreciate your time completing this evaluation.

1. Overall

How would you rate this module?

☐ poor ☐ fair ☐ good ☐ very good ☐ outstanding

2. Learning objectives

Please consider whether this module was successful in meeting the following learning objectives:

BLS paediatric Learning objectives of Module 1: ABC	Strongly disagree	Disagree	Slightly agree	Agree	Strongly agree
Reviewed the Australian Resuscitation Council Guidelines BLS (paediatric)	☐	☐	☐	☐	☐
Identified the indications for initiating paediatric basic life support	☐	☐	☐	☐	☐
Analysed the process by which paediatric resuscitation efforts are escalated within their	☐	☐	☐	☐	☐
Identified anatomical and physiological differences between children and adults which	☐	☐	☐	☐	☐
Practised basic airway manoeuvre techniques on infant and child manikins	☐	☐	☐	☐	☐
Practised basic airway manoeuvre techniques on infant and child manikins	☐	☐	☐	☐	☐
Practised external cardiac compressions on infant and child manikins	☐	☐	☐	☐	☐

3. Important learning outcomes

What are the three most important things you have learned from this module?

_____

_____

_____

_____

4. Module implementation

Please indicate to what extent you agree or disagree with each of the following statements in relation to the implementation of the module.

	Strongly disagree	Disagree	Slightly agree	Agree	Strongly agree
The facilitator respected my experience	☐	☐	☐	☐	☐
The facilitator encouraged my participation	☐	☐	☐	☐	☐
I was able to ask the facilitator questions	☐	☐	☐	☐	☐
The facilitator was able to answer my questions	☐	☐	☐	☐	☐
The feedback I received was clear	☐	☐	☐	☐	☐
The feedback I received will assist me in my future performance	☐	☐	☐	☐	☐
There was adequate time for the skills stations	☐	☐	☐	☐	☐
There was adequate time for the facilitated discussions	☐	☐	☐	☐	☐
There was adequate time for the simulations	☐	☐	☐	☐	☐
I have increased my confidence in performing paedatric BLS	☐	☐	☐	☐	☐
I have identified future learning needs in this topic area	☐	☐	☐	☐	☐

5. Future module implementation

Do you think the module should be altered in any way? ☐ yes ☐ no

If yes, what recommendations do you have?

Thank you

PowerPoint presentation

1.

Clinical Skills in Hospitals Project

Basic Life Support (BLS) Paediatric MODULE 1 'ABC'

StV

A Victorian Government initiative

Victoria

2.

Module Outline

- Discussion
- Skills stations
  - Airway
  - Breathing
  - Chest Compressions
- Summation
- Evaluation

3.

Indications for BLS

- No signs of life
- Unconscious
- Unresponsive
- Not moving
- Not breathing normally
- Pulse less <60 BPM

4.

Airway Management

- Consider differences between infant and child techniques for:
- Clear mouth and airway
- Head tilt / chin lift
- Jaw thrust
- Oro-pharyngeal airway
- Nasopharyngeal Airway

5.

Assisted Ventilation

- Mouth-to-mask
- Bag-mask

- Unobstructed airway
- Good seal
- Observe rise and fall of chest

6.

Chest Compression

- Most important aspect of BLS

- Lower half of sternum
- Infant Positioning- 2 finger or 2 thumbs
- Child Positioning- one hand, locked elbow
- Depress 1/3 chest depth
- 100 per minute

- 30:2 ratio compression:ventilation

Module 2: Automatic External Defibrillator (AED)

Introduction

BLS paediatric (basic life support) was developed as a teaching and learning tool for Victorian clinical educators. The information contained in each module was developed using evidence-based resources and examples of best practice. Where expert opinion varies, a discussion section is included. However, it is not within the scope of ALS paediatric to address the full spectrum of local variations. Variations can occur in several areas, including practices relating to types of equipment used, infection control processes, practice guidelines and so on. Therefore, educators should, where appropriate, adapt content to reflect their local policies, procedures and protocols. This will ensure the relevancy of the package content to your learners.

The modules are designed to be discrete courses in their own right. They are timetabled so they can be completed in a 1–2 hour timeframe. This timeframe was chosen after we received feedback from clinical educators requesting shorter courses, because health professionals often have limited time to educate away from patients. However, the packages may also be combined into a one- or two-day course, as described in the Module Outline.

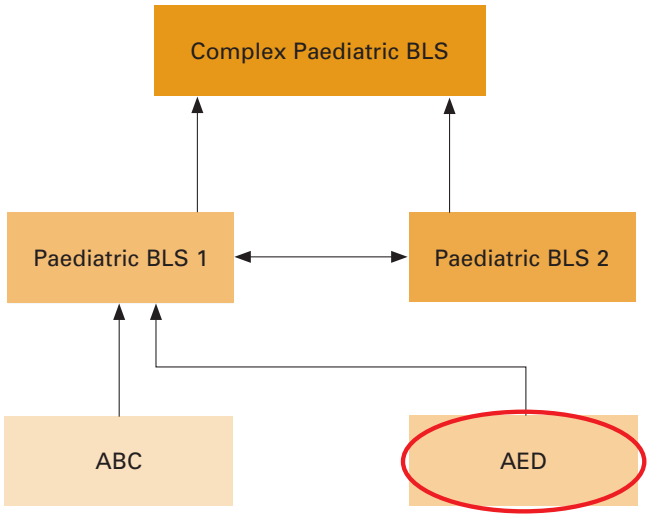
BLS paediatric should be used as an educational tool to assist in the teaching of clinical skills. It is structured as a guide to assist clinical educators, and uses many concepts taught in the *Clinical Skills in Hospitals Project* (Train-the-Trainer courses). Educators are encouraged to build on this resource by adding their own scenarios which incorporate hospital/health service protocols, policies and other resources. Each module is designed as a lesson plan to incorporate the simulations into the teaching of clinical skills.

Aims

BLS paediatric aims to make participants confident in their application of basic life support knowledge and skills on children in different environments and settings.

Package structure

BLS paediatric contains five modules which provide learning opportunities for health professionals at all levels of experience and from all health disciplines. Modules 1 and 2 are regarded as fundamental. Modules 3 and 4 are more difficult, and are regarded as intermediate. Module 5 is more advanced and regarded as complex.

Level of complexity	Package structure
Complex For participants with more than 4 years experience or who have completed Modules 1–4	
Intermediate For participants in postgraduate years 3–4 or who have completed Modules 1 and 2	
Fundamental For participants in postgraduate years 1–2	

These modules were designed to develop participants' knowledge, skills and behaviours in BLS and to expose them to increasingly complex scenarios aimed at testing their ability to combine these individual skills, work as a team and problem solve in more difficult situations.

Educators delivering these modules should be aware of participants' level of experience and choose appropriate modules. Modules presume an increasing level of knowledge as they progress, ranging from a fundamental knowledge of anatomy and physiology for the fundamental modules, up to detailed knowledge of BLS and resuscitation for the complex modules. Novice participants (such as first-year graduates) are expected to start with the fundamental modules, and only move onto intermediate and more complex modules as they demonstrate proficiency. More experienced participants may start at the intermediate level if the educator is satisfied that they have the prior knowledge and skills. Individual educators are responsible for assessing participants' baseline knowledge and determining which modules they need to complete. More specific descriptions of presumed knowledge are outlined in each module.

The design of these packages presumes that the clinical educators using them have knowledge and expertise in current best practice regarding the teaching of clinical skills and conducting facilitated discussions. Knowledge and expertise are presumed commensurate with the Department of Human Services' basic and advanced Train-the-Trainer Programs. Clinical educators are encouraged to refer to the Department of Human Services' *Clinical Skills Facilitators Manual* for theory on:

1. Peyton's model for teaching clinical skills
2. leading small group discussions
3. giving feedback
4. crisis resource management skills.

Module 2: Automatic External Defibrillator (AED)

Authors: Dr Nicole Shilkofski, Dr Robert O'Brien, Mr Julian Van Dijk

Definition

For the purposes of these modules, a 'child' is defined as approximately 1–8 years of age and an infant is less than approximately 1 year of age. These modules do not deal with newborn infants or neonates (under 28 days old).

Aims

The purpose of *BLS paediatric—Module 2: AED* is to teach participants how to safely use an automatic external defibrillator in the setting of paediatric basic life support (BLS).

Presumed knowledge

This module is targeted to health professionals with little or no experience in basic life support or defibrillation. However, they are expected to understand the differences between adult and child anatomy, that different BLS techniques are required for children, and have a basic knowledge of:

1. cardiovascular anatomy: heart, peripheral pulses
2. cardiovascular physiology: blood pressure, circulation.

Objectives

By the end of this module, participants should have:

1. analysed the clinical indications for the use of the AED in children
2. learned to recognise ventricular fibrillation and ventricular tachycardia
3. discussed the functionality of the AED
4. demonstrated the safe use of the AED for children in a simulated environment.

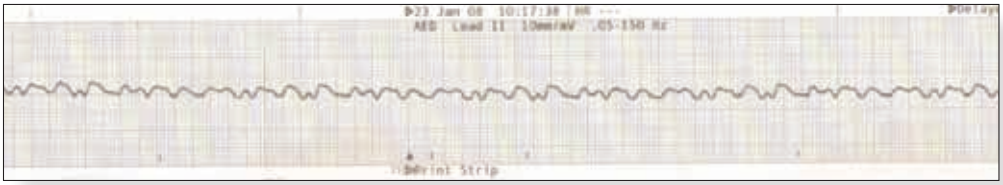
Background information for educators

Defibrillation is the only intervention of proven benefit for patients in cardiac arrest. It is most effective if delivered within the first minute of a cardiac arrest. The probability of successful defibrillation diminishes rapidly over time, and VF tends to deteriorate to asystole in minutes[1].

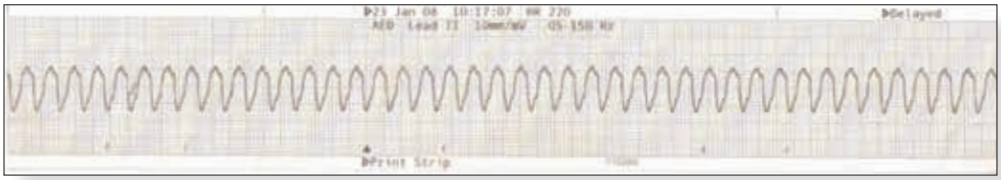
Defibrillation is the delivery of an electrical charge to the heart which stops all electrical activity and allows the normal pacemaker of the heart (the SA node), or another part of the heart, to 'reset' and initiate a more normal rhythm. The success of defibrillation depends on delivery of sufficient current to depolarise a critical mass of myocardium. Young children are much smaller than adults and thus require a lower energy setting for delivery of the same defibrillation dose (joules per kilogram).

Paediatric defibrillation is indicated in cases of a child in either of the following dysrhythmias:

1. ventricular fibrillation (VF)



2. pulseless ventricular tachycardia (VT)



Both these rhythms are due to chaotic electrical activity in the heart and are lethal if not treated. These patients will be unconscious, not breathing normally and have no detectable pulse or signs of life.

VF is an uncommon cause of out-of-hospital paediatric cardiac arrest in infants (< 1 year), but its occurrence increases with age. Studies report VF as the initial rhythms in 19–24% of out-of-hospital paediatric cardiac arrests if sudden infant death syndrome (SIDS) deaths are excluded.[2]

Defibrillator use was traditionally confined to medical institutions and services and used by a small group of professionals. Simple-to-use automatic external defibrillators (AEDs) have enabled those working outside such institutions, or those with limited skills, to perform defibrillation safely on appropriate patients. The use of AEDs in the community by laypersons is associated with an increased survival rate from out-of-hospital cardiac arrest[3]. This is reflected in the inclusion of automatic external defibrillation as a basic life support skill.

While identification of VF and VT is not necessary in order to deploy the AED successfully, this module covers recognition of these rhythms, and is a good primer. The skill is useful for appropriate participants who subsequently undertake the advanced life support module.

The AED:

1. automatically prompts the user regarding intervention
2. automatically interprets the heart rhythm
3. advises and prompts the user to deliver a shock only if needed.

An adult AED delivers a biphasic electrical wave to the patient at either 150 j or 200 j, depending on the brand of defibrillator. Most AEDs have a manual override feature allowing responders with greater skill to have more control over defibrillation.

The 2006 ARC and ILCOR guidelines indicate that biphasic shocks with an AED are acceptable for children 1 year and older. Attenuated shocks using child cables are recommended in children < 8 years.[4] Insufficient evidence exists to support a recommendation for or against the use of AEDs in children < 1 year.[4] if a paediatric energy dose is set at 50 joules (or attenuated to 50 joules via use of paediatric pads/cables), it is suitable for use in children 1–8 years (up to approximately 25 kg). Fifty (50) joules provides sufficient energy to ensure that children up to 8 years (or 55 kg) receive at least 2 j/kg.[5] A standard AED (without a dose attenuator) should be used for children > 25 kg (approximately 8 years) and for older adolescent/adult patients.

The concern with using an adult AED for infants and young children is that it will recommend delivery of a shock for non-shockable rhythms, due to baseline faster heart rates seen in paediatric patients. Therefore, the AED used for children should have an arrhythmia detection algorithm that demonstrates high specificity for paediatric shockable rhythms.[6] AED manufacturers have designed new paediatric pad/cable systems for use with AEDs designed for use in adults to reduce the energy delivered to patients under 8 years. This modification raises impedance of the pad/cable system, and diverts some of the delivered current away from the patient, so that the adult energy dose delivered by the AED is reduced to 50–75 joules. With paediatric pad/cable systems, most AEDs have appropriate sensitivity and specificity for paediatric arrhythmias, and both are safe and effective for defibrillation of children 1–8 years. Each AED model should be tested against a library of paediatric arrhythmias to document its efficacy in detection of shockable and non-shockable rhythms.[6]

Connect the AED to the patient once they are determined unconscious, are not breathing normally and show no signs of life. For a lone rescuer responding to a child without signs of circulation, ARC and ILCOR guidelines recommend giving 1 minute of CPR before any other action, including activating the EMS system or attaching the AED.[6] This is due to the high incidence of cardiac arrest which is secondary to respiratory arrest and can be potentially reversible with CPR and ventilation.

Follow these steps:

1. Turn on the AED.
2. Apply paediatric electrode pads to the patient's chest, as indicated by the icons: one below the right clavicle near right sternal border, the other over the left sixth intercostal space, mid-axillary line. For infants and small children, if the body surface area is too small to accommodate both pads on the front of the torso (anterior/anterior positioning), then place one on the front of the chest and one on the back in the middle of the scapulae (anterior/posterior positioning—see figure on next page).

3. Plug the pads into the defibrillator unit.
4. The AED automatically assesses the child's rhythm.
5. Do not touch the patient.
6. AED analysis will advise either: 'shock' or 'no shock'.
7. If 'shock' is advised, do not touch the patient, and advise all others to stand clear. Check for clearance visually.
8. Push the 'shock' button when advised and follow the subsequent prompts.
9. If 'no shock' is advised, the patient may still require CPR.

Figure 16: Child/infant AED pads correct position of AED pads

The AED has the potential to harm the user, bystanders or the patient. Responders using the AED should be aware of these risks:

1. Avoid placing the electrodes over implanted pacemakers or defibrillators. These devices may be damaged by the defibrillation charge.
2. Avoid touching the patient during defibrillation. Ensure that everyone 'stands clear' when discharging the defibrillator so that no rescuers are inadvertently shocked.
3. Do not shock the patient unless advised to by the AED. Attempts at defibrillation may worsen the patient's condition if they are not in VT or VF.
4. Avoid discharging in the presence of flammable materials, for example, petrol, gas, alcohol and oxygen, because sparks and fires may result.
5. Remove medication patches from patient's chest before defibrillation because these may also lead to sparks.

Learning activities

Suggested learning activities and timetable are outlined below.

Timing	Activity	Objective
40 minutes	Facilitated discussion	1 and 2
15 minutes	Familiarisation with defibrillator	2 and 3
30 minutes	Skills station: practice of defibrillation	4
10 minutes	Summary	All
10 minutes	Evaluation	

Total time = 1 hour 45 minutes

Facilitated discussion

The facilitator should lead a discussion amongst participants about the issues covered in the background information. This should include the clinical indications for use of the AED, identification of paediatric VF and VT and modifications of the AED device necessary for use in children. The facilitator should not give a didactic lecture, but instead promote open discussion and knowledge sharing amongst participants. Participants should be encouraged to describe any real-life experiences they have encountered. A limited number of PowerPoint slides might be appropriate, for example, to present examples of VF and VT.

The discussion should highlight institution-specific regulations or protocols, for example:

1. 'Who is accredited to use the AED?'
2. 'Where are the AEDs located?'
3. 'Where are our paediatric AED pads located?'
4. 'Is our AED approved for use in children?'

Familiarisation with defibrillator

The facilitator should spend 15 minutes demonstrating the features of the AED, the paediatric pads/cables and answering questions. This should be a hands-on experience, so that participants are properly familiarised with the AED before undertaking the skills station.

Skills station

This station allows participants to practise using the AED on a paediatric training manikin. Participants should demonstrate application of paediatric pads in the anterior/anterior position and the anterior/posterior position, as well as use of the AED. Participants should be guided through the use of the AED using Peyton's four-step model[7]. Feedback should be provided at the completion of the skill.

The program and resources required assume three facilitators for every 12 participants, a ratio of 1:4. Each facilitator should have access to one paediatric manikin suitable for teaching defibrillation (able to simulate VF and receive a defibrillation shock) and an AED or AED simulator. Each participant should have 7–8 minutes of hands-on experience while observing three colleagues for total of 30 minutes.

Summary

The summary session reinforces content covered in the learning activities, and is an opportunity for participants to reflect on what they have covered. No new material should be introduced.

Important points to summarise include:

- indications for use of AED and shockable rhythms
- the importance of giving 1 minute of CPR to paediatric patients before application of AED
- an emphasis on the age of the patient as a determinant of AED suitability (that is, not for use in patients < 1 year old. Paediatric pad used in ages 1–8 years)
- appropriate positioning of paediatric pads (anterior/anterior or anterior/posterior) depending on child's body surface area
- an emphasis on safety: being certain that all providers are clear of the patient when shock is delivered.

Resource list

The following resource list assumes three facilitators for 12 participants, a ratio of 1:4. As a minimum, the following resources are needed to conduct this module.

Resource	Quantity	Additional comments
Facilitators	3	Allows 1:4 ratio with 12 participants
ARC guideline 12.3, February 2006	1	For educator's reference as needed
Hospital AED protocol	1	If different from ARC Guidelines For educator's reference
Automatic external defibrillator	3	Including product manual for troubleshooting
Paediatric AED pads	3	May also have adult AED pads for size comparison
Paediatric manikin	3	Manikins (or AED simulator) should be capable of simulating VF and be receptive to defibrillation
Examples of VF/VT	12	One for each participant
Feedback sheets	3	As a prompt for each facilitator
Evaluation forms	12	One for each participant
PowerPoint presentation	1	Provided with module

Evaluation

A formal evaluation has been specifically developed for this module. It incorporates the objectives of the module and the perceptions of the participants about whether they have increased their understanding by working through the module. It is highly recommended that this formal evaluation be copied and completed by all participants at the completion of the module.

A range of informal evaluation tools may also be used in conjunction with this evaluation throughout the module, including those available in the Department of Human Services' *Clinical Skills Facilitators Manual* from the basic course conducted in 2007.

References

1. International Liaison Committee on Resuscitation 2005 Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Part 5: Electrical Therapies. Automated External Defibrillators, Defibrillation, Cardioversion and Pacing. Circulation 2005 112: iiv_35–iv_46
2. Mogayzel C., Quan L., Graves J.R., Tiedeman D., Fahrenbruch C. and Herndon P. 1995 Out-of-Hospital Ventricular Fibrillation in Children and Adolescents: Causes and Outcomes. *Annals of Emergency Medicine* 25: 484–491
3. Hallstrom A. and Ornato J. 2004 Public-Access Defibrillation and Survival After Out-of-Hospital Cardiac Arrest. N Eng J Med 351: 637–646
4. The International Liaison Committee on Resuscitation (ILCOR) 2006 Consensus on Science with Treatment Recommendations for Pediatric and Neonatal Patients: Pediatric Basic and Advanced Life Support. *Pediatrics* 117: E955–E977
5. Atkins D.L. and Jorgenson D. 2005 Attenuated Pediatric Electrode Pads for Automated External Defibrillator Use in Children. *Resuscitation* 66: 31–37
6. Samson R.A., Berg R.A. and Bingham R. 2003 Use of Automated External Defibrillators in Children: an Update—An Advisory Statement from the Pediatric Advanced Life Support Task Force, International Liaison Committee on Resuscitation. *Pediatrics* 112: 163–168
7. Peyton J. 1998 *Teaching and Learning in Medical Practice*. Manticore Europe Ltd, Great Britain

Resources

Facilitator feedback form

The following form should be used to assist you in giving feedback after each participant has practised their BLS skills at the skill station.

Feedback using the Pendleton model

Pendleton's model of feedback assists learners to maximize their potential at different stages of training, raise their awareness of strengths and areas for improvement, and identify actions to be taken to improve performance. Pendleton's rules are structured in such a way that the learner identifies the positives first, in order to create a safe environment. This is followed by the facilitator or group reinforcing these positives and discussing skills to achieve them. Different techniques are then suggested. The advantage of this method is that the learner's strengths are discussed first. Avoiding a discussion of weaknesses right at the beginning prevents defensiveness and allows reflective behaviour in the learner.

Below is a series of questions to assist you in this technique:

1. Ask the learner how they feel.
2. Ask the learner what went well and why (this can be combined with question 1 and 3).
3. Tell the learner what went well and why.
4. Ask the learner what could have been done better and why.
5. Tell the learner what could have been done better and why.
6. Summarise the learner's strengths and identify up to three things to concentrate on.

Note: This form does not need to be given to the participant — it is a guide for you, the group facilitator.

Module 2: Automatic External Defibrillator (AED)—evaluation

Thank you for participating in this module. As part of our commitment to quality improvement the following questionnaire will be used to plan future implementation of this module. We appreciate your time completing this evaluation.

1. Overall

How would you rate this module?

☐ poor ☐ fair ☐ good ☐ very good ☐ outstanding

2. Learning objectives

Please consider whether this module was successful in meeting the following learning objectives:

BLS paediatric Learning objectives of Module 2: AED	Strongly disagree	Disagree	Slightly agree	Agree	Strongly agree
Learned to recognise ventricular fibrillation and ventricular tachycardia	☐	☐	☐	☐	☐
Discussed the functionality of the AED	☐	☐	☐	☐	☐
Demonstrated the use of the AED for children safely in a simulated environment	☐	☐	☐	☐	☐
Learned to recognise ventricular fibrillation and ventricular tachycardia	☐	☐	☐	☐	☐

3. Important learning outcomes

What are the three most important things you have learned from this module?

4. Module implementation

Please indicate to what extent you agree or disagree with each of the following statements in relation to the implementation of the module.

	Strongly disagree	Disagree	Slightly agree	Agree	Strongly agree
The facilitator respected my experience	☐	☐	☐	☐	☐
The facilitator encouraged my participation	☐	☐	☐	☐	☐
I was able to ask the facilitator questions	☐	☐	☐	☐	☐
The facilitator was able to answer my questions	☐	☐	☐	☐	☐
The feedback I received was clear	☐	☐	☐	☐	☐
The feedback I received will assist me in my future performance	☐	☐	☐	☐	☐
There was adequate time for the skills stations	☐	☐	☐	☐	☐
There was adequate time for the facilitated discussions	☐	☐	☐	☐	☐
There was adequate time for the simulations	☐	☐	☐	☐	☐
I have increased my confidence in performing paedatric BLS	☐	☐	☐	☐	☐
I have identified future learning needs in this topic area	☐	☐	☐	☐	☐

5. Future module implementation

Do you think the module should be altered in any way? ☐ yes ☐ no

If yes, what recommendations do you have?

Thank you

PowerPoint presentation

1.

Clinical Skills in Hospitals Project

Basic Life Support (BLS) Paediatric MODULE 2 'AED'

A Victorian Government initiative

2.

Module Outline

- Discussion
- Skills stations
  - AED use
- Summation
- Evaluation

3.

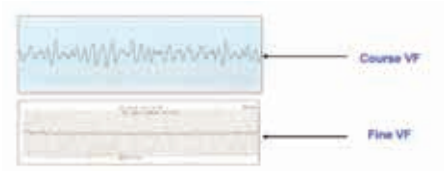
Indications for AED

- Ventricular fibrillation
- Pulseless ventricular tachycardia

4.

Ventricular Fibrillation

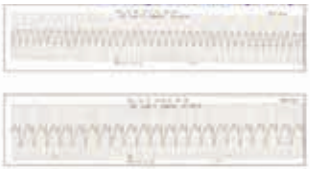
3 lead rhythm strips of Ventricular Fibrillation (VF)



5.

Ventricular Tachycardia

3 lead rhythm strips of Ventricular Tachycardia (VT)



6.

AED Functionality

- Turn on
- Apply electrode pads (as per instructions)
- Automatic analysis of rhythm
- "Shock" / "No shock" advised
- Push "Shock" button if advised

7.

AED Safety

- Don't touch patient
- Follow instructions
- Implanted pacemakers / defibrillators
- Fire risks

Module 3: Paediatric BLS 1

Introduction

BLS paediatric (basic life support) was developed as a teaching and learning tool for Victorian clinical educators. The information contained in each module was developed using evidence-based resources and examples of best practice. Where expert opinion varies, a discussion section is included. However, it is not within the scope of ALS paediatric to address the full spectrum of local variations. Variations can occur in several areas, including practices relating to types of equipment used, infection control processes, practice guidelines and so on. Therefore, educators should, where appropriate, adapt content to reflect their local policies, procedures and protocols. This will ensure the relevancy of the package content to your learners.

The modules are designed to be discrete courses in their own right. They are timetabled so they can be completed in a 1–2 hour timeframe. This timeframe was chosen after we received feedback from clinical educators requesting shorter courses, because health professionals often have limited time to educate away from patients. However, the packages may also be combined into a one- or two-day course, as described in the Module Outline.

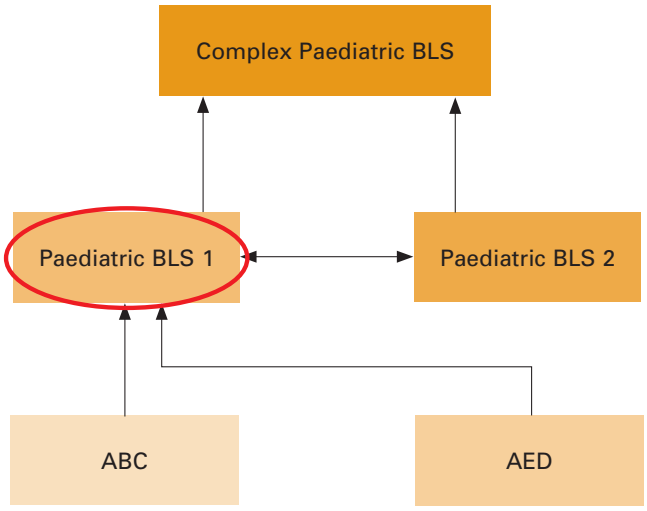
BLS paediatric should be used as an educational tool to assist in the teaching of clinical skills. It is structured as a guide to assist clinical educators, and uses many concepts taught in the *Clinical Skills in Hospitals Project* (Train-the-Trainer courses). Educators are encouraged to build on this resource by adding their own scenarios which incorporate hospital/health service protocols, policies and other resources. Each module is designed as a lesson plan to incorporate the simulations into the teaching of clinical skills.

Aims

BLS paediatric aims to make participants confident in their application of basic life support knowledge and skills on children in different environments and settings.

Package structure

BLS paediatric contains five modules which provide learning opportunities for health professionals at all levels of experience and from all health disciplines. Modules 1 and 2 are regarded as fundamental. Modules 3 and 4 are more difficult, and are regarded as intermediate. Module 5 is more advanced and regarded as complex.

Level of complexity	Package structure
Complex For participants with more than 4 years experience or who have completed Modules 1–4	
Intermediate For participants in postgraduate years 3–4 or who have completed Modules 1 and 2	
Fundamental For participants in postgraduate years 1–2	

These modules were designed to develop participants' knowledge, skills and behaviours in BLS and to expose them to increasingly complex scenarios aimed at testing their ability to combine these individual skills, work as a team and problem solve in more difficult situations.

Educators delivering these modules should be aware of participants' level of experience and choose appropriate modules. Modules presume an increasing level of knowledge as they progress, ranging from a fundamental knowledge of anatomy and physiology for the fundamental modules, up to detailed knowledge of BLS and resuscitation for the complex modules. Novice participants (such as first-year graduates) are expected to start with the fundamental modules, and only move onto intermediate and more complex modules as they demonstrate proficiency. More experienced participants may start at the intermediate level if the educator is satisfied that they have the prior knowledge and skills. Individual educators are responsible for assessing participants' baseline knowledge and determining which modules they need to complete. More specific descriptions of presumed knowledge are outlined in each module.

The design of these packages presumes that the clinical educators using them have knowledge and expertise in current best practice regarding the teaching of clinical skills and conducting facilitated discussions. Knowledge and expertise are presumed commensurate with the Department of Human Services' basic and advanced Train-the-Trainer Programs. Clinical educators are encouraged to refer to the Department of Human Services' *Clinical Skills Facilitators Manual* for theory on:

1. Peyton's model for teaching clinical skills
2. leading small group discussions
3. giving feedback
4. crisis resource management skills.

Module 3: Paediatric BLS 1

Authors: Dr Nicole Shilkofski, Dr Robert O'Brien, Mr Julian Van Dijk

Definition

For the purposes of these modules, a 'child' is defined as approximately 1–8 years of age and an infant is less than approximately 1 year of age. These modules do not deal with newborn infants or neonates (under 28 days old).

Aims

The purpose of *BLS paediatric—Module 3: BLS 1* is for participants to apply their paediatric basic life support (BLS) and automatic external defibrillator (AED) skills learned in the basic modules and perform a coordinated BLS response in a controlled setting.

Presumed knowledge

This module is targeted to health professionals who are competent in the component skills of paediatric BLS (airway, breathing and chest compressions). They should also understand the differences between adult and child anatomy, that different BLS techniques are required for children, and are expected to have an intermediate level of knowledge and skills relevant to:

1. paediatric BLS protocols, including the DRABC response
2. basic paediatric airway management
3. simple rescue breathing techniques in children
4. external cardiac compressions in infants and children
5. use of the AED in the paediatric patient.

Participants should have already practised these skills on child manikins, but may not have had an opportunity to apply them to a clinical scenario. If participants do not yet feel confident with the individual skills, they should be redirected to *BLS paediatric—Module 1: ABC* and *Module 2: AED*.

Objectives

By the end of this module, participants should have:

1. reviewed the Australian Resuscitation Council (ARC) BLS Guidelines for cardiac arrest in children
2. demonstrated their ability to assess a collapsed child and determine the need for BLS
3. applied paediatric BLS skills according to the ARC principles of DRABC to a simulated paediatric patient (manikin)

4. performed team-based cardiopulmonary resuscitation (CPR) of a paediatric patient in a simulated environment
5. demonstrated the use of an AED on a simulated paediatric patient (manikin).

Background information for educators

Much of the background information pertaining to paediatric airway, breathing and chest compressions and AED use is covered in *BLS paediatric—Module 1: ABC* and *Module 2: AED*. The purpose of this module is for participants to put these skills together as 'cardiopulmonary resuscitation' of a child in a controlled team environment.

Many studies show that lay rescuers and health care providers are often unable to determine accurately the presence of a pulse within 10 seconds.[1] Lay rescuers should start CPR if the infant or child shows no signs of life (unconscious, unresponsive, not moving and not breathing normally). Health care professionals may also check for a pulse, but should proceed with CPR if they cannot feel a pulse or are uncertain if a pulse is present.[1] Initial steps in paediatric resuscitation should follow DRABC format, and include:

1. Check for **danger**.
2. Check for **response**.
3. Open the **airway** look for signs of life.
4. Call **000** or the resuscitation team.
5. Give rescue **breathing**: 2 breaths.
6. Give 30 chest **compressions**, followed by 2 breaths (BLS providers).
7. Attach AED with paediatric pads (for patients 1–8 years) and follow prompts.

Elements of effective CPR include[1, 2]:

1. Avoid interruptions to chest compressions.
2. Avoid over-ventilation (which increases intrathoracic pressure and reduces blood flow).
3. Compression-to-ventilation ratio of 30:2 (for BLS providers).
4. Delivery of 5 cycles over 2 minutes.

Both lay personnel and professional health care workers often experience difficulty detecting a pulse in collapsed patients. Minimise interruption of chest compressions to maximise cerebral and coronary perfusion and increase the likelihood of survival with intact neurologic function. Do not interrupt chest compressions to check for signs of life.

Learning activities

Suggested learning activities and timetables are outlined below. Timetable 1 is designed for 12 participants working in two groups of six. Timetable 2 is designed for six participants working together.

Timetable 1			
Timing	Activity		Objective
20 minutes	Introduction and discussion of simulation		1
	Group 1	Group 2	
10 minutes	Simulation 1	Simulation 2	All
30 minutes	Debrief	Debrief	All
10 minutes	Simulation 2	Simulation 1	All
30 minutes	Debrief	Debrief	All
10 minutes	Summary		All
10 minutes	Evaluation		

Total time = 2 hours

Timetable 2		
Timing	Activity	Objective
20 minutes	Introduction and discussion of simulation	1
10 minutes	Simulation 1	All
30 minutes	Debrief	All
10 minutes	Simulation 2	All
30 minutes	Debrief	All
10 minutes	Summary	All
10 minutes	Evaluation	

Total time = 2 hours

Introduction

The facilitator should lead a brief discussion amongst participants to refresh or clarify any issues relating to paediatric BLS protocols and to introduce the simulation training to follow. This should not be a comprehensive lecture on BLS. The ARC paediatric BLS protocol[2] should be displayed prominently, and can also be provided to participants as a handout.

The discussion should highlight any departures from ARC Guidelines peculiar to that institution. Institution-specific 'paediatric cardiac arrest call' nomenclature and phone numbers should be reinforced.

Simulation sessions

This exercise allows participants to practise their paediatric BLS skills as a team in a simulated environment. Participants are exposed to a mock cardiac arrest situation in a child and are expected to manage this within the confines of BLS skills.

The program assumes two facilitators for every 12 participants. Participants should be divided into two groups of six (Timetable 1). Three participants each participate in one scenario and observe a second. The debriefing period should include all six participants of that group—that is, the active participants and their observers. It is possible to run these scenarios with smaller groups. If only six participants are present, Simulations 1 and 2 can be run sequentially (Timetable 2).

These scenarios can be run on low-fidelity simulators (for example, Resus Anne), but are also quite suitable for more sophisticated simulators (for example, Sim Man, HPS METI).

Simulation 1: Bradycardia progressing to asystolic arrest in an infant

Scenario design

In this scenario, participants are required to recognise apnoea and bradycardia in an infant which requires ventilation and then progresses to asystole, necessitating CPR.

Case history	
Patient details	
Sex	Male
Age	6 months
Past history	Full-term infant, frequent otitis media
Social history	Lives with both parents, one sibling aged 5, developmentally normal
History of present illness	Admitted two days before with pneumonia requiring IV antibiotics and oxygen therapy Has had increasing tachypnea and hypoxia over past 24 hours
Presenting symptoms	Found in crib barely conscious and bradycardic by health professional on the general medical ward

Resources	
General	
Setting/environment	Hospital medical ward
Patient attire	Hospital gown, nappy
Monitoring	Cardiorespiratory monitor, pulse-oximetry in place
Supporting documentation required	Bedside drug chart, observation chart

Equipment		
Equipment	**Number**	**Sourced from**
Manikin	1	
Hospital bed/trolley	1	
Hospital gown/nappy	1 each	
Baby blanket	1	
Patient bedside chart	1	
Hudson mask and tubing	1	
OP and NP airways	1–2 each of different sizes	
Bag-mask device	1	
Oxygen supply	1	

Roles
Participant 1
You are a health professional going to review an infant admitted with pneumonia on the general medical ward. You find that the baby is unwell and you need to initiate management. You have two colleagues to call on for assistance. Some basic resuscitation equipment is located in an adjacent room. You will need to retrieve these items. You should manage the patient according to your capabilities and professional roles in real life—that is, medical, nursing or allied health—within the confines of paediatric BLS skills.
Participants 2 and 3
You are health professionals on a general medical ward. Your colleague (Participant 1) may ask for assistance with managing a patient. If asked to help, you should manage the patient according to your capabilities and professional roles in real life—that is, medical, nursing or allied health. Some basic resuscitation equipment is located in an adjacent room. You will need to retrieve these items.
Faculty role play: Cardiac arrest team
You are a senior medical person at the hospital, part of the hospital's paediatric cardiac arrest team. At the conclusion of the scenario, you arrive with the paediatric crash cart and prepare to take over the care of the infant. You may ask for a handover from the participants. If the participants experience difficulties, it might be appropriate to enter the scenario earlier and offer assistance.

Simulator programming considerations				
System	Baseline state	Change in State 1	Change in State 2	Resolution
CVS	Bradycardic, heart rate 55, progresses to asystole within 30–60 seconds	Asystole	n/a	Sinus tachycardia after 3–4 minutes of CPR and effective ventilation Return of spontaneous circulation (pulses) (assume return of pulses if low-fidelity manikin)
Respiratory	Apnoeic	Apnoeic	n/a	Return of spontaneous respirations, RR 35 (assume return of spontaneous respiration if low-fidelity manikin)
Neurologic	Eyes closed, barely responsive	Unconscious	n/a	Return of consciousness GCS = 14 (assume GCS 14 if low-fidelity manikin)
Response to participant intervention	No attempt at ventilation nor CPR then remains in baseline state Bag-mask ventilation and CPR go to resolution	Bag-mask ventilation, chest compressions and called for assistance then send cardiac arrest team	n/a	Paediatric cardiac arrest team arrives

Debriefing points:

- recognition of need to initiate hospital's paediatric 'cardiac arrest response'
- initiation of CPR in paediatric bradycardia and asystole
- effective ABC management
- effective hand positioning for infant CPR
- if the team applies AED, discuss why defibrillation is not advisable in asystole, and why this infant is too young for AED use.

Simulation 2: Paediatric pulseless VT

Scenario design

In this scenario, a 7-year-old is brought to emergency in his parent's car after losing consciousness in the back yard after he was struck in the chest with a cricket ball. He is in pulseless VT.

Case history	
Patient details	
Sex	Male
Age	7 years
Past history	Fractured right humerus two years ago
Social history	Only child, lives with parents
History of present illness	Presents to emergency carried in by parents unconscious after being struck in the chest with the ball while playing cricket
Presenting symptoms	Unconscious, pulseless, ventricular tachycardia

Resources	
General	
Setting/environment	Hospital emergency department
Patient attire	Jeans, t-shirt
Monitoring	None initially
Supporting documentation required	Arrest documentation sheet

Equipment		
Equipment	Number	Sourced from
Manikin	1	
Hospital bed/trolley	1	
Jeans/t-shirt	1	
Pillow, blanket	1 each	
Patient bedside chart	1	
Hudson mask and tubing	1	
OP and NP airways	1 or 2 each, in different sizes	
Bag-mask device	1	
Oxygen supply	1	
AED	1	
Paediatric AED pads	1 set	

Roles
Participant 1
You are a health professional working in emergency. You are called in to assess a child who was carried in by his parents after collapsing in the back yard while playing cricket. You find that the patient is unwell and you need to initiate management. You have two colleagues to call on for assistance. Some basic resuscitation equipment and an AED are located in an adjacent room. You will need to retrieve these. You should manage the patient according to your capabilities and professional roles in real life—that is, medical, nursing or allied health.
Participants 2 and 3
You are health professionals working in an emergency department. Your colleague (Participant 1) may ask for assistance with managing a patient. If asked to help, you should manage the patient according to your capabilities and professional roles in real life—that is, medical, nursing or allied health. Some basic resuscitation equipment and an AED are located in an adjacent room. You will need to retrieve these.
Faculty role play: Emergency physician
You are a senior emergency physician at the hospital. Toward the conclusion of the scenario, you arrive and prepare to take over the care of the patient. You were previously occupied intubating an unconscious trauma patient. You may ask for a handover from the participants. If the participants experience difficulties or have not promptly initiated use of the AED, it might be appropriate to enter the scenario earlier and offer assistance.

Simulator programming considerations				
System	Baseline state	Change in State 1	Change in State 2	Resolution
CVS	Ventricular tachycardia, pulseless	n/a *	n/a	Sinus tachycardia after three defibrillations Return of spontaneous circulation (pulses) (assume return of pulses if low-fidelity manikin)
Respiratory	Apnoeic	n/a	n/a	Return of spontaneous respirations, RR 18 (assume return of spontaneous respiration if low-fidelity manikin)
Neurologic	Unresponsive	n/a	n/a	Return of consciousness GCS = 14 (assume GCS 14 if low-fidelity manikin)
Response to participant intervention	No CPR then remains in baseline state CPR and successful use of AED with paediatric pads go to resolution	n/a	n/a	

** For participants who perform well, the patient could be returned to VT so that prolonged CPR and multiple attempts at defibrillation are needed.*

Debriefing points:

- recognition of need to initiate hospital's paediatric 'cardiac arrest response' or call for help in an emergency department setting
- initiation of CPR with appropriate compression-to-ventilation ratios and appropriate hand positioning for a child of this age
- effective ABC management
- effective use of AED with paediatric pads—discuss why the AED is appropriate for use on this patient, given his age.

Summary

The summary session reinforces content covered in the learning activities, and is an opportunity for participants to reflect on what they have learned. No new material should be introduced.

Major points to recap in the summary include:

- assessment of the collapsed paediatric patient
- DRABC steps of paediatric BLS
- compression-to-ventilation ratios and hand positioning in infants compared to children during CPR
- coordination of resuscitation efforts in an emergency setting
- safe and appropriate use of AED with paediatric pads in children aged 1–8.

Participants should be encouraged to review the appropriate ARC Guidelines in their own time to reinforce the skills acquired in this module. They should be offered access to equipment and educators in the future if they need to practise or improve their skill level or confidence. Participants might also be encouraged to attend and observe a real-life paediatric arrest in order to put these skills into a clinical context.

Resource list

The following resource list assumes two facilitators for every 12 participants. As a minimum, the following resources are needed to conduct this module.

Resource	Quantity	Additional comments
Facilitators	2	Allows one facilitator per simulation
ARC paediatric BLS flowchart	1	For display in tutorial area
ARC paediatric BLS flowchart handout	12	One for each participant
Hospital paediatric BLS protocol	1	Only if different from ARC Guidelines
Hospital AED protocol in children	1	For educator's reference
Infant and child manikins	2 each	Suitable for airway management, capable of simulating VF/VT and receptive to defibrillation
Oropharyngeal airways	4, of different sizes	Two for each manikin
Oxygen supply	2	May be piped or bottled
Bag-mask ventilation devices (two sizes: paediatric and adult)	2 of each size	Different sizes in order to compare tidal volume of bags for different age groups
AED	2	
AED paediatric pads	2 sets	
Feedback forms	2	As a prompt for each facilitator
Evaluation forms	12	One for each participant

Evaluation

A formal evaluation has been specifically developed for this module. It incorporates the objectives of the module and the perceptions of the participants about whether they have increased their understanding by working through the module. It is highly recommended that this formal evaluation be copied and completed by all participants at the completion of the module.

A range of informal evaluation tools may also be used in conjunction with this evaluation throughout the module, including those available in the Department of Human Services' *Clinical Skills Facilitators Manual* from the basic course conducted in 2007.

References

1. The International Liaison Committee on Resuscitation 2006 ILCOR Consensus on Science with Treatment Recommendations for Pediatric and Neonatal Patients: Pediatric Basic and Advanced Life Support. *Pediatrics* 117: E955–E977
2. Australian Resuscitation Council Guideline 7: Cardiopulmonary Resuscitation. February 2006.

Resources

Facilitator feedback form

The following form should be used to assist you in giving feedback after each participant has practised their BLS skills at the skill station.

Feedback using the Pendleton model

Pendleton's model of feedback assists learners to maximize their potential at different stages of training, raise their awareness of strengths and areas for improvement, and identify actions to be taken to improve performance. Pendleton's rules are structured in such a way that the learner identifies the positives first, in order to create a safe environment. This is followed by the facilitator or group reinforcing these positives and discussing skills to achieve them. Different techniques are then suggested. The advantage of this method is that the learner's strengths are discussed first. Avoiding a discussion of weaknesses right at the beginning prevents defensiveness and allows reflective behaviour in the learner.

Below is a series of questions to assist you in this technique:

1. Ask the learner how they feel.
2. Ask the learner what went well and why (this can be combined with question 1 and 3).
3. Tell the learner what went well and why.
4. Ask the learner what could have been done better and why.
5. Tell the learner what could have been done better and why.
6. Summarise the learner's strengths and identify up to three things to concentrate on.

Note: This form does not need to be given to the participant — it is a guide for you, the group facilitator.

Module 3: Paediatric BLS 1—evaluation

Thank you for participating in this module. As part of our commitment to quality improvement the following questionnaire will be used to plan future implementation of this module. We appreciate your time completing this evaluation.

1. Overall

How would you rate this module?

☐ poor ☐ fair ☐ good ☐ very good ☐ outstanding

2. Learning objectives

Please consider whether this module was successful in meeting the following learning objectives:

BLS paediatric Learning objectives of Module 3: BLS 1	Strongly disagree	Disagree	Slightly agree	Agree	Strongly agree
Reviewed the Australian Resuscitation Council (ARC) BLS Guidelines for cardiac arrest in children	☐	☐	☐	☐	☐
Demonstrated ability to assess a collapsed child and determine the need for BLS	☐	☐	☐	☐	☐
Applied paediatric BLS skills according to the ARC principles of DRABC to a simulated paediatric patient (manikin)	☐	☐	☐	☐	☐
Performed team-based cardiopulmonary resuscitation (CPR) on a paediatric patient in a simulated environment	☐	☐	☐	☐	☐
Demonstrated the use of an AED on a simulated paediatric patient (manikin)	☐	☐	☐	☐	☐

3. Important learning outcomes

What are the three most important things you have learned from this module?

4. Module implementation

Please indicate to what extent you agree or disagree with each of the following statements in relation to the implementation of the module.

	Strongly disagree	Disagree	Slightly agree	Agree	Strongly agree
The facilitator respected my experience	☐	☐	☐	☐	☐
The facilitator encouraged my participation	☐	☐	☐	☐	☐
I was able to ask the facilitator questions	☐	☐	☐	☐	☐
The facilitator was able to answer my questions	☐	☐	☐	☐	☐
The feedback I received was clear	☐	☐	☐	☐	☐
The feedback I received will assist me in my future performance	☐	☐	☐	☐	☐
There was adequate time for the skills stations	☐	☐	☐	☐	☐
There was adequate time for the facilitated discussions	☐	☐	☐	☐	☐
There was adequate time for the simulations	☐	☐	☐	☐	☐
I have increased my confidence in performing paedatric BLS	☐	☐	☐	☐	☐
I have identified future learning needs in this topic area	☐	☐	☐	☐	☐

5. Future module implementation

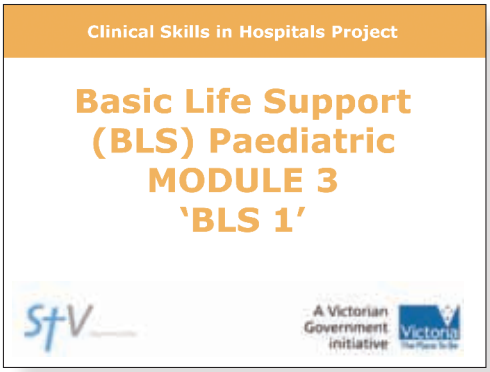
Do you think the module should be altered in any way? ☐ yes ☐ no

If yes, what recommendations do you have?

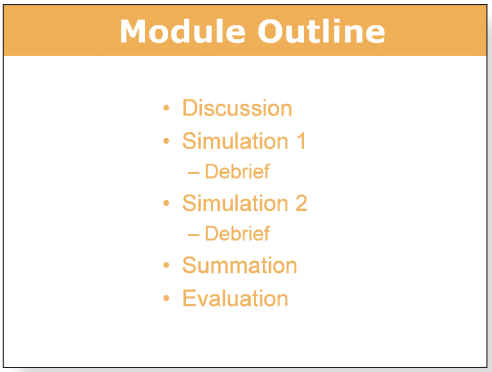
Thank you

PowerPoint presentation

1.



2.



Module 4: Paediatric BLS 2

Introduction

BLS paediatric (basic life support) was developed as a teaching and learning tool for Victorian clinical educators. The information contained in each module was developed using evidence-based resources and examples of best practice. Where expert opinion varies, a discussion section is included. However, it is not within the scope of ALS paediatric to address the full spectrum of local variations. Variations can occur in several areas, including practices relating to types of equipment used, infection control processes, practice guidelines and so on. Therefore, educators should, where appropriate, adapt content to reflect their local policies, procedures and protocols. This will ensure the relevancy of the package content to your learners.

The modules are designed to be discrete courses in their own right. They are timetabled so they can be completed in a 1–2 hour timeframe. This timeframe was chosen after we received feedback from clinical educators requesting shorter courses, because health professionals often have limited time to educate away from patients. However, the packages may also be combined into a one- or two-day course, as described in the Module Outline.

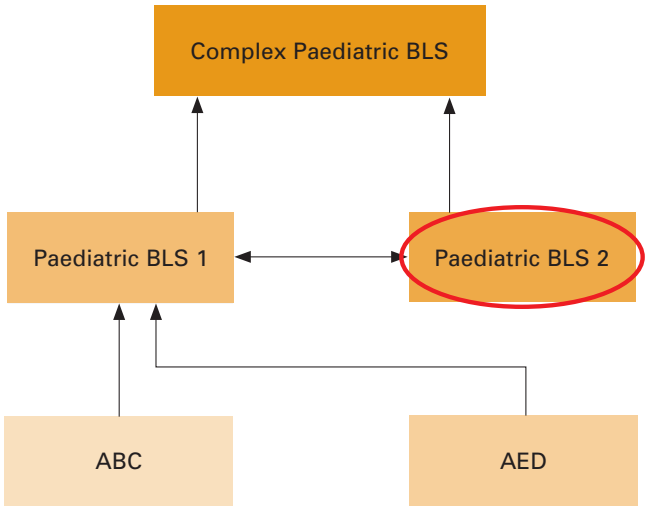
BLS paediatric should be used as an educational tool to assist in the teaching of clinical skills. It is structured as a guide to assist clinical educators, and uses many concepts taught in the *Clinical Skills in Hospitals Project* (Train-the-Trainer courses). Educators are encouraged to build on this resource by adding their own scenarios which incorporate hospital/health service protocols, policies and other resources. Each module is designed as a lesson plan to incorporate the simulations into the teaching of clinical skills.

Aims

BLS paediatric aims to make participants confident in their application of basic life support knowledge and skills on children in different environments and settings.

Package structure

BLS paediatric contains five modules which provide learning opportunities for health professionals at all levels of experience and from all health disciplines. Modules 1 and 2 are regarded as fundamental. Modules 3 and 4 are more difficult, and are regarded as intermediate. Module 5 is more advanced and regarded as complex.

Level of complexity	Package structure
Complex For participants with more than 4 years experience or who have completed Modules 1–4	
Intermediate For participants in postgraduate years 3–4 or who have completed Modules 1 and 2	
Fundamental For participants in postgraduate years 1–2	

These modules were designed to develop participants' knowledge, skills and behaviours in BLS and to expose them to increasingly complex scenarios aimed at testing their ability to combine these individual skills, work as a team and problem solve in more difficult situations.

Educators delivering these modules should be aware of participants' level of experience and choose appropriate modules. Modules presume an increasing level of knowledge as they progress, ranging from a fundamental knowledge of anatomy and physiology for the fundamental modules, up to detailed knowledge of BLS and resuscitation for the complex modules. Novice participants (such as first-year graduates) are expected to start with the fundamental modules, and only move onto intermediate and more complex modules as they demonstrate proficiency. More experienced participants may start at the intermediate level if the educator is satisfied that they have the prior knowledge and skills. Individual educators are responsible for assessing participants' baseline knowledge and determining which modules they need to complete. More specific descriptions of presumed knowledge are outlined in each module.

The design of these packages presumes that the clinical educators using them have knowledge and expertise in current best practice regarding the teaching of clinical skills and conducting facilitated discussions. Knowledge and expertise are presumed commensurate with the Department of Human Services' basic and advanced Train-the-Trainer Programs. Clinical educators are encouraged to refer to the Department of Human Services' *Clinical Skills Facilitators Manual* for theory on:

1. Peyton's model for teaching clinical skills
2. leading small group discussions
3. giving feedback
4. crisis resource management skills.

Module 4: Paediatric BLS 2

Authors: Dr Nicole Shilkofski, Dr Robert O'Brien, Mr Julian Van Dijk

Definition

For the purposes of these modules, a 'child' is defined as approximately 1–8 years of age and an infant is less than approximately 1 year of age. These modules do not deal with newborn infants or neonates (under 28 days old).

Aims

The purpose of *BLS paediatric—Module 4: BLS 2* is for participants to apply their paediatric basic life support (BLS) and automatic external defibrillator (AED) skills learned in the basic modules to practise and perform a coordinated paediatric BLS response in a more complex clinical setting.

Presumed knowledge

This module is targeted to health professionals with some experience in paediatric BLS. They should understand the differences between adult and child anatomy, that different BLS techniques are required for children, and are expected to have an intermediate level of knowledge and skills relevant to:

1. paediatric BLS protocols, including the DRABC response
2. basic paediatric airway management
3. simple rescue breathing techniques in children
4. external cardiac compressions in children
5. use of the AED in children.

Participants should also have practised these skills on child and infant manikins and had an opportunity to apply them to the clinical scenario in *BLS paediatric—Module 3: BLS 1*. If participants do not yet feel confident with the individual skills, they should be redirected to *BLS paediatric—Module 1: ABC*, *Module 2: AED* and *Module 3: BLS 1*.

Objectives

By the end of this module, participants should have:

1. reviewed the Australian Resuscitation Council (ARC) BLS Guidelines1 for cardiac arrest in children
2. demonstrated their ability to assess a simulated child (manikin) mimicking a collapsed person and determine the need for BLS
3. applied paediatric BLS skills according to the ARC principles of DRABC in a simulated environment
4. performed team-based cardiopulmonary resuscitation (CPR) of a child in a complex clinical setting
5. demonstrated the use of an AED with paediatric pads in a difficult clinical setting.

Background information for educators

Much of the background information pertaining to airway, breathing and chest compressions and AED use in children is covered in *BLS paediatric—Module 1: ABC* and *Module 2: AED*. Participants undertaking B*LS paediatric—Module 4: BLS 2* should have the previous knowledge and skills in paediatric BLS, as well as in the use of the AED in children. Participants should have also undertaken the simulation exercise in *BLS paediatric—Module 3: BLS 1*, a straightforward paediatric CPR scenario. The purpose of this module is for participants to use these skills in a more difficult clinical scenario.

Performing CPR and deploying the AED in unusual environments may be problematic or technically difficult, or may be associated with unique risks.

Sparks and fires were reported when poorly applied defibrillator paddles were used in oxygen-rich environments[1]. The fire flash rushes over the oxygen-rich environment, often without burning the skin until it meets an 'edge', such as a fold of clothing or bed linen. The most severe fires were reported when ventilator tubing was disconnected from the tracheal tube and left adjacent to the patient's head. Recommendations describe how, if detached from the patient, oxygen sources should be moved to a distance of one metre (1 m) from the defibrillation paddles[2, 3].

If the patient is wet, or is in a wet environment, potential exists for the electric charge to travel preferentially outside the body. This would reduce the amount of charge actually delivered to the patient's heart, and may result in unsuccessful defibrillation. Risk of electric shock to the rescuer is also possible. Most recommendations include removing the patient from water or pools of water and drying the chest before attempts at defibrillation. By using an AED, rescuers can defibrillate without touching the patient. Manufacturer safety studies show that minimal voltages (< 3 volts) are detected in the surrounding wet environment[4, 5].

Drowning or near-drowning of a child is a situation in which health professionals could encounter the need for BLS skills outside of the hospital environment. Public access defibrillators programs in Australia have made a community-based response feasible in locations where drowning can occur, such as community pools. Survival from out-of-hospital cardiac arrest in Australia remains poor, with less than 10% of patients leaving hospital alive[6]. However, early initiation of CPR and early defibrillation are the keys to improved survival. In the 2006–07 financial year 277 people drowned in Australia[7]. In 2007 there were 37 drowning deaths, of these 21 were children aged 5–14[7]. 46% of young children under 5 years drowned in swimming pools[8].

Resuscitation of drowning patients follows the ARC BLS Guidelines. However, drowning victims should be rolled onto their side during initial checking and potential clearing of the airway. The rescuer should check for breathing while the patient is in the side position. Drowning patients often have laryngeal spasm and aspiration of water and vomit, so clearing of the upper airway is vital. Do not attempt to drain water from the lungs[9]. Although the patient's stomach may be distended at the time of rescue or after resuscitation efforts, do not attempt to empty the stomach by external pressure[9]. Patients recovered from shallow water often have an associated fracture or dislocation of the cervical spine (see below). Defibrillation can be ineffective if the myocardium is cold, but children have been successfully defibrillated at temperatures of 27–30˚C. If the heart is in asystole, CPR should continue until the patient's temperature is at least 32˚C[10]. Recorded cases exist of full neurological recovery after CPR for more than two hours after cold water drowning[11].

Consider the risk of cervical spine injury in patients who sustained trauma before or due to their collapse. Consider cervical spine immobilisation, chin lift (compared to head tilt) and careful rescue breathing to minimise movement of the cervical spine. Patients may need to be moved to allow access for multiple rescuers and to perform efficient BLS. Determining the risk of cervical spine injury may be difficult; however, children may be at higher risk in the following circumstances[12, 13, 14]:

- after a fall from a height greater than a body length
- if signs of injury are present (especially facial trauma and head injury)
- if evidence of diving exists
- after a motor vehicle accident.

Airway management takes precedence over any suspected spinal injury[14]. The unconscious patient must be handled gently, with no twisting, and minimal movement of the head and neck. Maintain spinal alignment during turning or log rolling.

Sometimes, less experienced or lay personnel need to be recruited to assist in BLS. These people should be assigned to the least complex tasks, for example, chest compression, rather than bag-mask ventilation. If the number of rescuers is limited, chest compression is the most important task to perform while waiting for the AED[15].

Learning activities

Suggested learning activities and timetables are outlined below. Timetable 1 is designed for 12 participants working in two groups of six. Timetable 2 is designed for six participants working together.

Timetable 1			
Timing	Activity		Objective
20 minutes	Facilitated discussion		1
	Group 1	Group 2	
15 minutes	Simulation 1	Simulation 2	All
25 minutes	Debrief	Debrief	All
15 minutes	Simulation 2	Simulation 1	All
25 minutes	Debrief	Debrief	All
10 minutes	Summary		All
10 minutes	Evaluation		

Total time = 2 hours

Timetable 2		
Timing	Activity	Objective
20 minutes	Facilitated discussion	1
15 minutes	Simulation 1	All
25 minutes	Debrief	All
15 minutes	Simulation 2	All
25 minutes	Debrief	All
10 minutes	Summary	All
10 minutes	Evaluation	

Total time = 2 hours

Facilitated discussion

The facilitator should lead a brief discussion amongst participants to refresh or clarify issues relating to paediatric BLS protocols, and to introduce the simulation training to follow. This should not be a comprehensive lecture on paediatric BLS. The clinical settings and/or complexity of these scenarios are more difficult than those in *BLS paediatric—Module 3: BLS 1*, so spend some time in the facilitated discussion exploring participants' experience with resuscitations where environmental issues or patient factors have had, or might make, management difficult. The discussion should serve as a primer for the remainder of the module.

Major issues which the facilitator should cover include:

- ARC paediatric BLS protocols
- paediatric BLS and AED safety in unusual environments (wet areas, oxygen)
- assessing the risk of spinal injury and need for immobilisation in a traumatic injury
- cervical spine precautions in paediatric BLS.

Simulation session

This exercise allows participants to practise their paediatric BLS skills as a team in a more difficult clinical environment. Participants are exposed to a mock paediatric cardiac arrest situation and are expected to manage this within in the confines of BLS skills.

The activities assume two facilitators for every 12 participants. Participants should be divided into two groups of six (Timetable 1). Three participants each participate in one scenario and observe a second. The debriefing period should include all six participants of that group—that is, the active participants and their observers. It is possible to run these scenarios with smaller groups. If only six participants are present, Simulations 1 and 2 can be run sequentially (Timetable 2).

These scenarios can be run on low-fidelity simulators (for example, Resus Anne), but are also quite suitable for more sophisticated simulators (for example, Sim Man).

Simulation 1: Child dropped from a height/suspected spinal injury

Scenario design

In this scenario, an infant presents to emergency with fever, poor feeding and persistent crying. While in the emergency department waiting room awaiting triage, her father accidentally drops her from a standing height onto the tiled floor in the waiting room. She loses consciousness and becomes apnoeic, but has a pulse. Participants are required to recognise respiratory failure and initiate assisted ventilation with cervical spine protection while discussing the best method of moving the infant to a monitored setting in emergency.

Case history	
Patient details	
Sex	Female
Age	18 months
Past history	Colic, frequent upper respiratory tract infections
Social history	Lives with mother and father, only child, developmentally normal
History of present illness	Two days of fever, poor feeding and persistent crying In the emergency waiting room, her father drops her onto her head from a standing height onto the tiled floor and she stops crying
Presenting symptoms	Unconscious, apnoeic

Resources	
General	
Setting/environment	Emergency department waiting room
Patient attire	Jumpsuit
Monitoring	None initially
Supporting documentation required	Patient registration chart

Equipment		
Equipment	Number	Sourced from
Baby manikin	1	
Portable monitor	1	
Paediatric bag-mask	1	
Paediatric cervical collar	1	
OP airways	1	
Portable oxygen supply	1	
AED	1	
Paediatric AED pads	1 set	

Roles
Participants 1 and 2
You are both in the triage area of emergency and look up when you hear a scream to find a child unconscious on the floor of the waiting room area. You need to initiate management, call for additional help if warranted and source equipment from the emergency department as needed. You should manage the patient according to your capabilities and professional roles in real life—that is, medical, nursing or allied health.
Participant 3
You may be called to assist with an emergency of an unconscious child. Follow instructions from Participants 1 and 2, who should give you a handover about the details of the patient's condition. You should help to manage the patient according to your capabilities and professional roles in real life—that is, medical, nursing or allied health.
Faculty role play: Emergency physician
You arrive if called by participants to assist with the resuscitation of an infant who was dropped and lost consciousness. You should arrive toward the end of the resuscitation after spontaneous breathing has resumed. If cervical spine immobilisation was not initiated, you should suggest doing so, as well as moving the patient in a coordinated fashion into an emergency cubicle for further management and monitoring.
Faculty role play: Father
You are waiting to be seen with your 18-month-old daughter in the emergency department waiting room. She has had fever for several days and has cried incessantly for the past three hours. You are standing with her in your arms attempting to comfort her when she begins screaming and wriggles out of your arms. You realise with horror that you have dropped her and she has gone quiet. You scream for help. During the scenario, you stay out of the way and do not ask questions of the participants. You feel very guilty, but realise it was an accident. After she has resumed breathing, you can ask 'What will happen next?'

Simulator programming considerations				
System	Baseline state	Change in State 1	Change in State 2	Resolution
CVS	Sinus bradycardia, HR 70	n/a	n/a	Normal sinus rhythm with effective ventilation, HR 130
Respiratory	Apnoeic	n/a	n/a	Return of spontaneous respirations, RR 28 (assume return of spontaneous respiration if low-fidelity manikin)
Neurologic	Unresponsive	n/a	n/a	Return of consciousness GCS = 12 (assume GCS 12 if low-fidelity manikin)
Response to participant intervention	No manual ventilation then remains in baseline state Successful use of bag-mask and airway adjuncts with cervical immobilisation go to resolution	n/a	n/a	

Debriefing points:

- issues surrounding obtaining assistance and equipment quickly in non-clinical environments re scenario starting in emergency waiting room.
- management of patient with potential cervical spine injury, including airway management techniques and coordinated movement of patients with spinal alignment maintained.
- effective ABC management.

Simulation 2: Injured/wet child—drowning patient

Scenario design

In this scenario, a 7-year-old healthy child is swimming at the local pool. He is found by the pool's lifesaver floating face down in the water after having dived into the shallow end of the pool head first. He has pulseless VF. Participants are required to recognise this, manage the airway with cervical spine precautions in place, deal with the environmental hazards and confines, initiate CPR and deploy the AED available at the local pool.

Case history	
Patient details	
Sex	Male
Age	7 years
Past history	None, healthy
Social history	Lives with mother and father
History of present illness	Swimming at local pool, dived head first into shallow end of pool and became unconscious after striking head
Presenting symptoms	Unconscious, pulseless VF, apnoeic

Resources	
General	
Setting/environment	Community pool, wet surroundings
Patient attire and appearance	Wet bathers Evidence of facial injuries, broken teeth, blood around mouth
Monitoring	None
Supporting documentation required	None

Equipment		
Equipment	Number	Sourced from
Manikin	1	
Wet bathers	1	
'Blood' for facial injury	1	
Pocket mask	1	
Portable oxygen supply	1	
AED	1	
AED paediatric pads	1 set	
Towels	2	
Paediatric cervical collar or towels to stabilise Cervical-spine	3 towels or 1 collar	

Roles
Participant 1
You are enjoying an afternoon at the pool in summer when you hear a cry for help from the pool's lifesaver, who has just discovered a child needing assistance. You should initiate management of the child in accordance with BLS principles. You have two other medical professionals to assist you, who also arrive with the call for help. Basic resuscitation equipment, including an AED, are available at the pool if it is required. You will need to ask the lifesaver to retrieve these if needed. You should manage the patient according to your capabilities and professional roles in real life—that is, medical, nursing or allied health.
Participants 2 and 3
You are enjoying an afternoon at the pool in summer when Participant 1 calls for your help with a child who was just found in the pool by the lifesaver. You should assist Participant 1 and the lifesaver with management of the child. Some basic resuscitation equipment, including an AED, is available at the pool if required. You will need to ask the lifesaver to retrieve these if needed. When asked to help, you should manage the patient according to your capabilities and professional roles in real life—that is, medical, nursing or allied health.
Faculty role play: Lifesaver
You are the lifesaver at a community pool and have just noticed a child floating face down in the shallow end of the pool after having dived in. You know the child from the local swim club and recall that he is a healthy 7-year-old. You call out for help from any available medical personnel present at the pool. You are trained in BLS and should be helpful, but are wary of leading the resuscitation efforts. If asked, you should retrieve the resuscitation equipment and AED. If the participants experience difficulties, it might be appropriate to prompt the next steps in management and offer additional assistance.
Faculty role play: Ambulance officer
If called by participants, you arrive toward the end of the scenario, request a handover about the patient and treatment to that point and prepare to transport the child to hospital.

Simulator programming considerations				
System	Baseline state	Change in State 1	Change in State 2	Resolution
CVS	Ventricular fibrillation, pulseless	n/a *	n/a	Sinus tachycardia after three defibrillations Return of spontaneous circulation (pulses) (assume return of pulses if low-fidelity manikin)
Respiratory	Apnoeic	n/a	n/a	Return of spontaneous respirations, RR 18 (assume return of spontaneous respiration if low-fidelity manikin)
Neurologic	Unresponsive	n/a	n/a	Return of consciousness GCS = 10 (assume GCS 10 if low-fidelity manikin)
Response to participant intervention	No CPR then remains in baseline state CPR and successful use of AED go to resolution	n/a	n/a	

** For participants who perform well, the patient could be returned to VF so that prolonged CPR and multiple attempts at defibrillation are needed.*

Debriefing points:

- AED safety issues
- activation of emergency medical response system/ambulance when out of hospital
- cervical spine precautions: when to fit C-collar in a drowning patient
- BLS considerations in the drowning paediatric patient
- initiation of CPR
- effective ABC management
- effective use of AED.

Summary

The summary session reinforces content covered in the learning activities, and is an opportunity for participants to reflect on what they have covered. No new material should be introduced.

Points to cover in the summary include:

- assessment of the collapsed child
- DRABC steps of paediatric BLS
- coordination of resuscitation efforts
- difficulties of delivering BLS in unusual environments
- safe and appropriate use of AED in children
- cervical spine precautions and management of suspected spinal injury
- resuscitation of the drowning child.

Participants should be encouraged to review the appropriate ARC Guidelines in their own time to reinforce the skills acquired in this module. They should be offered access to equipment and educators in the future if they need to practise or improve their skill level or confidence. Participants might also be encouraged to attend and observe a real-life cardiac arrest in order to put these skills into a clinical context.

Resource list

The following resource list assumes two facilitators for every 12 participants. As a minimum, the following resources are needed to conduct this module.

Resource	Quantity	Additional comments
Facilitators	2	Allows one facilitator per simulation
ARC paediatric BLS flowchart	1	For reference in introduction
ARC Guidelines 4, 5, 6, 7, 8.7, 8.18 and 11.5, February 2006	1	For educator's reference as needed
Hospital BLS protocol	1	Only if different from ARC Guidelines
Hospital AED protocol	1	For educator's reference
Manikins	2	Suitable for airway management, capable of simulating VF/VT and receptive to defibrillation
Oropharyngeal and nasopharyngeal airways	2 sets	One for each manikin
Oxygen supply	2	May be piped or bottled
Bag-mask ventilation devices	2	May be a pocket mask for drowning scenario
AED	2	
AED paediatric pads	2 sets	
Paediatric cervical collar	2	For both scenarios, or can use towels to stabilise neck
Towels	1	For drowning scenario
Feedback forms	2	As prompt for each facilitator
Evaluation forms	12	One for each participant
PowerPoint presentation	1	

Evaluation

A formal evaluation has been specifically developed for this module. It incorporates the objectives of the module and the perceptions of the participants about whether they have increased their understanding by working through the module. It is highly recommended that this formal evaluation be copied and completed by all participants at the completion of the module.

A range of informal evaluation tools may also be used in conjunction with this evaluation throughout the module, including those available in the Department of Human Services' *Clinical Skills Facilitators Manual* from the basic course conducted in 2007.

References

1. Cummins R. 2002 Danger of Fires in Defibrillation in an Oxygen-Enriched Environment. *Currents in Emergency Cardiovascular Care* (American Heart Association) 13: 11–12
2. McNulty G. and Robertshaw H. 1999 Risk of Fire Outweighed by Need for Oxygen and Defibrillation. *J Accid Emerg Med* 16: 77
3. Australian Resuscitation Guideline 11.5: Electrical Therapy for Advanced Life Support. February 2006
4. Gould-Bartose A. 2006 *Defibrillation on a Wet or Metal Surface*. Zoll Medical Technical Report
5. American Heart Association 2005 Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Part 14: First Aid. Circulation 2005 112: 196–203
6. Australian Resuscitation Council Guideline 10.1.3: Public Access Defibrillation. November 2004
7. Royal Life Saving Society Australia *2007 National Drowning Report* at: www.royallifesaving.com.au
8. Ross F.I., Elliott E.J., Lam L.T. and Cass D.T. 2003 Children Under Five Years Presenting to Paediatricians with Near-Drowning. *J Paediatr Child Health* 39: 446–450
9. Australian Resuscitation Guideline 8.7: Resuscitation of the Drowning Patient. February 2005
10. Harries M. 2003 ABC of Resuscitation: Near Drowning. *British Medical Journal* 327: 1336–1338
11. Chappell J. 1988 Defibrillation After Near Drowning. *British Medical Journal* 296: 643–644

12. American Heart Association 2005 Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Part 10.7: Cardiac Arrest Associated with Trauma. Circulation 2005 112: 146–149
13. American Heart Association 2005 Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. Part 10.3: Drowning. Circulation 2005 112: 133–135
14. Australian Resuscitation Guideline 8.18: Management of Suspected Spinal Injury. July 1997
15. Hallstrom A., Cobb L., Johnson E. and Copass M. 2000 Cardiopulmonary Resuscitation by Chest Compression Alone or with Mouth-to-Mouth Ventilation. *N Eng J Med* 342: 1546–1553

Resources

Facilitator feedback form

The following form should be used to assist you in giving feedback after each participant has practised their BLS skills at the skill station.

Feedback using the Pendleton model

Pendleton's model of feedback assists learners to maximize their potential at different stages of training, raise their awareness of strengths and areas for improvement, and identify actions to be taken to improve performance. Pendleton's rules are structured in such a way that the learner identifies the positives first, in order to create a safe environment. This is followed by the facilitator or group reinforcing these positives and discussing skills to achieve them. Different techniques are then suggested. The advantage of this method is that the learner's strengths are discussed first. Avoiding a discussion of weaknesses right at the beginning prevents defensiveness and allows reflective behaviour in the learner.

Below is a series of questions to assist you in this technique:

1. Ask the learner how they feel.
2. Ask the learner what went well and why (this can be combined with question 1 and 3).
3. Tell the learner what went well and why.
4. Ask the learner what could have been done better and why.
5. Tell the learner what could have been done better and why.
6. Summarise the learner's strengths and identify up to three things to concentrate on.

Note: This form does not need to be given to the participant — it is a guide for you, the group facilitator.

Module 4: Paediatric BLS 2—evaluation

Thank you for participating in this module. As part of our commitment to quality improvement the following questionnaire will be used to plan future implementation of this module. We appreciate your time completing this evaluation.

1. Overall

How would you rate this module?

☐ poor ☐ fair ☐ good ☐ very good ☐ outstanding

2. Learning objectives

Please consider whether this module was successful in meeting the following learning objectives:

BLS paediatric Learning objectives of Module 4: BLS 2	Strongly disagree	Disagree	Slightly agree	Agree	Strongly agree
Reviewed the Australian Resuscitation Council (ARC) BLS Guidelines[1] for cardiac arrest in children	☐	☐	☐	☐	☐
Demonstrated their ability to assess a simulated child (manikin) mimicking a collapsed person and determine the need for BLS	☐	☐	☐	☐	☐
Applied paediatric BLS skills according to the ARC principles of DRABC in a simulated environment	☐	☐	☐	☐	☐
Performed team-based cardiopulmonary resuscitation (CPR) of a child in a complex clinical setting	☐	☐	☐	☐	☐
Demonstrated the use of an AED with paediatric pads in a difficult clinical setting	☐	☐	☐	☐	☐

3. Important learning outcomes

What are the three most important things you have learned from this module?

4. Module implementation

Please indicate to what extent you agree or disagree with each of the following statements in relation to the implementation of the module.

	Strongly disagree	Disagree	Slightly agree	Agree	Strongly agree
The facilitator respected my experience	☐	☐	☐	☐	☐
The facilitator encouraged my participation	☐	☐	☐	☐	☐
I was able to ask the facilitator questions	☐	☐	☐	☐	☐
The facilitator was able to answer my questions	☐	☐	☐	☐	☐
The feedback I received was clear	☐	☐	☐	☐	☐
The feedback I received will assist me in my future performance	☐	☐	☐	☐	☐
There was adequate time for the skills stations	☐	☐	☐	☐	☐
There was adequate time for the facilitated discussions	☐	☐	☐	☐	☐
There was adequate time for the simulations	☐	☐	☐	☐	☐
I have increased my confidence in performing paedatric BLS	☐	☐	☐	☐	☐
I have identified future learning needs in this topic area	☐	☐	☐	☐	☐

5. Future module implementation

Do you think the module should be altered in any way? ☐ yes ☐ no

If yes, what recommendations do you have?

Thank you

PowerPoint presentation

1.

Clinical Skills in Hospitals Project

Basic Life Support (BLS) Paediatric MODULE 4 'BLS 2'

A Victorian Government initiative

2.

Module Outline

- Discussion
- Simulation
  - Debrief
- Simulation
  - Debrief
- Summation
- Evaluation

Module 5: Complex paediatric BLS

Introduction

BLS paediatric (basic life support) was developed as a teaching and learning tool for Victorian clinical educators. The information contained in each module was developed using evidence-based resources and examples of best practice. Where expert opinion varies, a discussion section is included. However, it is not within the scope of ALS paediatric to address the full spectrum of local variations. Variations can occur in several areas, including practices relating to types of equipment used, infection control processes, practice guidelines and so on. Therefore, educators should, where appropriate, adapt content to reflect their local policies, procedures and protocols. This will ensure the relevancy of the package content to your learners.

The modules are designed to be discrete courses in their own right. They are timetabled so they can be completed in a 1–2 hour timeframe. This timeframe was chosen after we received feedback from clinical educators requesting shorter courses, because health professionals often have limited time to educate away from patients. However, the packages may also be combined into a one- or two-day course, as described in the Module Outline.

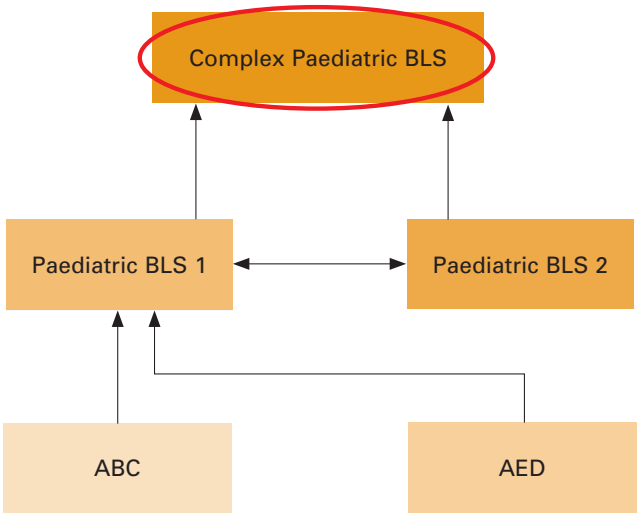
BLS paediatric should be used as an educational tool to assist in the teaching of clinical skills. It is structured as a guide to assist clinical educators, and uses many concepts taught in the *Clinical Skills in Hospitals Project* (Train-the-Trainer courses). Educators are encouraged to build on this resource by adding their own scenarios which incorporate hospital/health service protocols, policies and other resources. Each module is designed as a lesson plan to incorporate the simulations into the teaching of clinical skills.

Aims

BLS paediatric aims to make participants confident in their application of basic life support knowledge and skills on children in different environments and settings.

Package structure

BLS paediatric contains five modules which provide learning opportunities for health professionals at all levels of experience and from all health disciplines. Modules 1 and 2 are regarded as fundamental. Modules 3 and 4 are more difficult, and are regarded as intermediate. Module 5 is more advanced and regarded as complex.

Level of complexity	Package structure
Complex For participants with more than 4 years experience or who have completed Modules 1–4	
Intermediate For participants in postgraduate years 3–4 or who have completed Modules 1 and 2	
Fundamental For participants in postgraduate years 1–2	

These modules were designed to develop participants' knowledge, skills and behaviours in BLS and to expose them to increasingly complex scenarios aimed at testing their ability to combine these individual skills, work as a team and problem solve in more difficult situations.

Educators delivering these modules should be aware of participants' level of experience and choose appropriate modules. Modules presume an increasing level of knowledge as they progress, ranging from a fundamental knowledge of anatomy and physiology for the fundamental modules, up to detailed knowledge of BLS and resuscitation for the complex modules. Novice participants (such as first-year graduates) are expected to start with the fundamental modules, and only move onto intermediate and more complex modules as they demonstrate proficiency. More experienced participants may start at the intermediate level if the educator is satisfied that they have the prior knowledge and skills. Individual educators are responsible for assessing participants' baseline knowledge and determining which modules they need to complete. More specific descriptions of presumed knowledge are outlined in each module.

The design of these packages presumes that the clinical educators using them have knowledge and expertise in current best practice regarding the teaching of clinical skills and conducting facilitated discussions. Knowledge and expertise are presumed commensurate with the Department of Human Services' basic and advanced Train-the-Trainer Programs. Clinical educators are encouraged to refer to the Department of Human Services' *Clinical Skills Facilitators Manual* for theory on:

1. Peyton's model for teaching clinical skills
2. leading small group discussions
3. giving feedback
4. crisis resource management skills.

Module 5: Complex paediatric BLS

Authors: Dr Nicole Shilkofski, Dr Robert O'Brien, Mr Julian Van Dijk

Definition

For the purposes of these modules, a 'child' is defined as approximately 1–8 years of age and an infant is less than approximately 1 year of age. These modules do not deal with newborn infants or neonates (under 28 days old).

Aims

The purpose of *BLS paediatric*—Module 5: Complex BLS is for participants to use their clinical, management and personal skills in dealing with a complex paediatric basic life support (BLS) scenario.

Presumed knowledge

This module is targeted to health professionals with significant experience in paediatric BLS. They should also understand the differences between adult and child anatomy, that different BLS techniques are required for children, and have completed *BLS paediatric—Module 3: BLS 1* and *Module 4: BLS 2*. They should also have a high level of knowledge and skills relevant to:

1. paediatric BLS protocols
2. basic airway management in children
3. rescue breathing techniques in children
4. external cardiac compressions in children
5. use of the automatic external defibrillator (AED) in children
6. managing critical paediatric patients.

Participants who do not feel totally comfortable with these clinical skills should be redirected to *BLS paediatric—Module 3: BLS 1* and *Module 4: BLS 2*.

Objectives

By the end of this module, participants should have:

1. reviewed the Australian Resuscitation Council (ARC) BLS Guidelines1 for cardiac arrest in children
2. practised paediatric BLS as a team member in a difficult clinical setting
3. reflected on their ability to problem solve under stress
4. reflected on their ability to communicate effectively on an interpersonal level in a stressful situation
5. recognised factors that influence team performance.

Background information for educators

Much of the background information pertaining to airway, breathing and chest compressions and AED use is covered in *BLS paediatric—Module 1: ABC* and *Module 2: AED*. Participants should have practised these skills and worked as teams in *BLS paediatric—Module 3: BLS 1* and *Module 4: BLS 2*.

This module allows participants to use these skills in a more complex scenario where the issues are not necessarily clinical. Clinical knowledge is assumed. As evident from the learning activities, most of the discussion will revolve around opinions and experiences, rather than hard clinical facts.

Managing critically ill children is a stressful challenge. Success relies on clinical knowledge and skills, but also on effective individual performance, teamwork and health care systems. Health professionals may need to deal with deficiencies in each of these aspects as well as confronting distressing emotional responses in parents and family members.

Crisis resource management[2] (CRM) describes a set of strategies or skills developed to help individuals and teams to perform efficiently in these high risk/high stress situations. Common CRM principles include:

- know your environment (workplace, equipment, staff and policies)
- anticipate and plan (proactive contingency planning, expect the unexpected)
- call for help early
- exercise leadership
- communicate clearly
- use all available information
- allocate attention wisely (determine focus, avoid fixation, prioritise)
- distribute workload evenly.

Clinical educators are referred to Chapter 2 in the *Clinical Skills Facilitator's Advanced Course Manual* for more detailed information and references.

The performance of individuals—either on their own or as part of a team—has important implications for managing critical events. Individuals should be aware of factors that might influence personal performance in themselves or their colleagues, such as:

- experience and knowledge levels
- situational stress (some stress is good, too much may be harmful)
- fatigue and tiredness
- difficult environments (noise, distractions, unfamiliarity, workload, staff, resources)

- negative life events (illness, family crises)
- attitude and personality (anti-authority, impulsive, invulnerable, macho)
- drug and alcohol use.

Some of these issues might need to be directly addressed (adequate sleep, drug and alcohol counselling, education); in others, recognition and support may be adequate (for example, family crises). Similarly, effective and efficient teamwork and leadership are crucial in dealing with critical clinical situations. Effective teams are characterised by[2, 3]:

- organisation
- leadership
- familiarity of members
- designated roles
- effective communication
- situational awareness (the 'big picture')
- avenues for conflict resolution.

Effective team leaders are characterised by:

- clear communication of plans and goals
- allocation of tasks
- remaining free to oversee management
- being receptive to input from team members
- situational awareness, maintaining team focus
- prioritisation and problem solving
- promoting a positive group culture.

Effective communication is characterised by:

- directed, assertive communication in simple language (use eye contact and people's names)
- calm, polite, controlled tone and voice
- passage of information through leader as central relay
- verification of task completion and referral back to leader ('closing the loop')
- team awareness of situation.

Despite the best efforts of health professionals, many children will die due to their cardiac arrest, particularly if this occurs outside the hospital setting[4, 5].

Conversations to this effect with parents are difficult and emotionally charged. While not unanimous, the literature generally supports relatives being present during resuscitation[6, 7]. Recent studies show that seeing the events of the resuscitation efforts often affect family members' ability to believe the outcome6. This difficult task may be made a little easier by:

- choosing an appropriate private setting
- establishing trust
- asking the parents what they understand
- responding to emotions
- offering support
- appreciating and accommodating cultural variations in the way families deal with resuscitation and death
- 'hope for the best, but prepare for the worst'.

Learning activities

Suggested learning activities and timetables are outlined below. Timetable 1 is designed for 12 participants working in two groups of six. Timetable 2 is designed for six participants working together.

Timetable 1			
Timing	Activity		Objective
40 minutes	Facilitated discussion		1
	Group 1	Group 2	
15 minutes	Simulation 1	Simulation 2	2, 3, 4 and 5
30 minutes	Debrief	Debrief	2, 3, 4 and 5
15 minutes	Simulation 2	Simulation 1	2, 3, 4 and 5
30 minutes	Debrief	Debrief	2, 3, 4 and 5
10 minutes	Summary		2, 3, 4 and 5
10 minutes	Evaluation		

Total time = 2 hours 30 minutes

Timetable 2		
Timing	Activity	Objective
40 minutes	Facilitated discussion	1
15 minutes	Simulation 1	2, 3, 4 and 5
30 minutes	Debrief	2, 3, 4 and 5
15 minutes	Simulation 2	2, 3, 4 and 5
30 minutes	Debrief	2, 3, 4 and 5
10 minutes	Summary	2, 3, 4 and 5
10 minutes	Evaluation	

Total time = 2 hours 30 minutes

Facilitated discussion

The facilitator should introduce the simulation training to follow and lead a discussion amongst participants around the individual performance, teamwork and CRM. There should be little need to cover the clinical aspects of paediatric BLS.

While the clinical conditions in the scenarios are straightforward, non-clinical issues make the scenarios more complex and difficult for the participants. Therefore, participants should spend some time in the facilitated discussion exploring their experiences with resuscitations where human factors and communications have affected their ability to function clinically.

Major issues which the facilitator should cover include:

- teamwork principles
- barriers to individual performance
- effective leadership
- effective teams
- effective team communication
- effective communication with parents and family members.

PowerPoint slides are available for the facilitator to use to summarise these main points at the end of the discussion, or as triggers if participants have not identified the major issues. However, facilitators should avoid delivering a didactic lecture.

Simulation session

This exercise allows participants to practise their paediatric BLS skills as a team in a clinical environment complicated by equipment failure and human factor issues. Participants are exposed to a paediatric mock cardiac arrest situation, and are expected to manage the clinical aspects within in the confines of BLS skills.

The program assumes two facilitators for every 12 participants. Participants should be divided into two groups of six (Table 1). Three participants will each participate in one scenario and observe a second. The debriefing period should include all six participants of that group, that is, the active participants and their observers.

As a more complex scenario, it may be difficult to enrol 12 participants. It is possible to run these scenarios with smaller groups. If only six participants are present, Simulations 1 and 2 can be run sequentially (Table 2).

These scenarios can be run on low-fidelity simulators (for example, Resus Anne), but are also quite suitable for more sophisticated simulators (for example, Sim Man).

Simulation 1: Paediatric trauma patient/distraught team member/ unsuitable equipment

Scenario design

In this scenario, a 4-month-old presents to emergency unconscious and asystolic with bruises on his abdomen, legs and face after being in the care of mother's boyfriend. He is asystolic. Participants are required to recognise this, manage the airway according to BLS guidelines and initiate CPR. The paramedic who brought the child in is distraught because he was unable to ventilate the patient adequately and does not have paediatric advanced airway skills. He also recognises the infant because he transported him to hospital two months ago for a femur fracture. Participants are initially given an adult-sized bag-mask device. They must recognise this and request a paediatric-sized bag-mask device.

Case history	
Patient details	
Sex	Male
Age	4 months
Past history	Femur fracture at 2 months old when he 'rolled off the bed'
Social history	Lives with mother and mother's boyfriend, biological father is not involved
History of present illness	Brought to emergency by paramedic team after mother arrived home from work to find the infant listless and barely responsive Fresh bruises cover his abdomen, face and legs
Presenting symptoms	Apnoeic, unresponsive, asystolic

Resources	
General	
Setting/environment	Hospital emergency department
Patient attire and appearance	Nappy and jumpsuit
Monitoring	None initially, cardiorespiratory monitor can be applied in ED
Supporting documentation required	Resuscitation chart

Equipment		
Equipment	**Number**	**Sourced from**
Manikin	1	
Nappy/jumpsuit	1	
Resuscitation chart	1	
Infant OP airways	1 set	
Bag-mask devices: adult sized and paediatric sized	1 each	
Oxygen supply	1	

Roles
Participants 1, 2 and 3
You are three health professionals working in an emergency department. You receive handover from a paramedic who has just brought in an unresponsive infant from home. An AED and basic airway equipment are available if you require them. Some issues may arise which are not necessarily clinical problems.
Faculty role play: Paramedic
You are a hard-working and conscientious paramedic with good clinical skills. You are very skilled at managing adult airways, but are unable to intubate infants and children. You have just retrieved an infant from his home who was left in the care of the mother's boyfriend. She arrived home to find him listless and barely responsive. When you arrive, the child is apnoeic, but has a pulse. You recognise the infant as the same child you picked up two months earlier with a femur fracture. You blame yourself for not recognising signs of abuse and are quite distraught about this and the prognosis of the infant. You are helpful and competent in the resuscitation and can assist at the direction of the participants. However, you are distraught and close to tears because the infant has now become asystolic. You say things like 'This wouldn't have happened if I had recognised the problem two months ago', 'I'm sorry, it's all my fault', 'Do you think the baby will survive?' If participants recognise the need to apply a cervical collar and do so, you berate yourself for not recognising this need sooner.
Faculty role play: Emergency registrar/physician
You are an emergency physician/registrar at the hospital. Toward the conclusion of the scenario, you arrive and prepare to take over the care of the patient. You may ask for a handover from the participants. If the participants experience difficulties, it might be appropriate to enter the scenario earlier and offer assistance. If a cervical collar was not applied, you should suggest doing so when you arrive.

Simulator programming considerations				
System	Baseline state	Change in State 1	Change in State 2	Resolution
CVS	Asystole, pulseless	n/a	n/a	Sinus tachycardia after 3–4 cycles of CPR Return of spontaneous circulation (pulses) (assume return of pulses if low-fidelity manikin)
Respiratory Available equipment (bag-and-mask) are an unsuitable size for an infant—participants must request a smaller size	Apnoeic	n/a	n/a	Return of spontaneous respirations, RR 40 (assume return of spontaneous respiration if low-fidelity manikin)
Neurologic	Unresponsive	n/a	n/a	Return of consciousness GCS = 10 (assume GCS 10 if low-fidelity manikin)
Response to participant intervention	No CPR then remains in baseline state CPR and successful airway management go to resolution	n/a	n/a	

Debriefing points:

- equipment suitability for infant-sized patient
- unfamiliarity with equipment
- effective leadership and teamwork
- team communication
- managing/helping distressed colleagues
- use of cervical collar in possible/suspected trauma such as child abuse
- prognosis post-asystolic arrest in an infant.

Simulation 2: The upset parent

Scenario design

In this scenario, a 13-month-old was admitted to the ward for workup of fever, dehydration and possible sepsis. She suddenly becomes unresponsive on the ward and her mother calls for help. She is in pulseless VT arrest. Participants are required to recognise this, initiate CPR and deploy the AED. The mother is in attendance, and is upset and angry.

Case history	
Patient details	
Sex	Female
Age	13 months
Past history	Full-term infant, healthy
Social history	Lives at home with single mother and 2-year-old sibling
History of present illness	Admitted for prolonged fevers, dehydration and possible bacterial sepsis On IV antibiotics Increasingly tachycardic over the past 4–5 hours Some concern about possible myocarditis Arrangements are being made for transfer to children's hospital
Presenting symptoms	Turns blue and stops breathing in her hospital crib in front of mum, who calls for help when monitor begins to alarm

Resources	
General	
Setting/environment	Hospital paediatric ward
Patient attire and appearance	Hospital gown and nappy
Monitoring	Cardiorespiratory monitor, which has just begun alarming
Supporting documentation required	Bedside medication/observation chart

Equipment		
Equipment	**Number**	**Sourced from**
Manikin	1	
Hospital gown and nappy	1 each	
Bedside charts	1	
OP airway	1	
Paediatric bag-mask device	1	
Oxygen supply	1	
AED	1	
Paediatric AED pads	1 set	

Roles
Participants 1, 2 and 3
You are three health professionals on a ward round on the paediatric ward. You are called into a patient's room by a frantic mother. You are expected to assess and begin initial treatment of the child. Some issues may arise which are not necessarily clinical problems. If you need it, an AED and basic airway equipment are in an adjacent room, which you will need to retrieve.
Faculty role play: Angry and upset mother
You are the single mother of a 13-month-old infant with another child (2 years old) at home. You were recently told that your 13-month-old has deteriorated and arrangements are being made for transfer to a higher acuity setting, but no one has explained what exactly is wrong. You feel ignored and that no one understands how sick your baby really is. You are quite stressed by this alongside trying to manage the care of your well toddler at home. Your interactions with the resuscitation team vary from showing concern for the baby ('Will he be okay?', 'Please help him, do everything!', 'What's happening now?') to expressing your anger ('I told them she was really sick!', 'I'll sue the hospital for this!', 'No one will tell me what is going on!').
Faculty role play: Paediatric cardiac arrest team
You are a senior medical person at the hospital, part of the hospital's paediatric arrest team. At the conclusion of the scenario, you arrive with the crash cart and prepare to take over the care of the child. You may ask for a handover from the participants. If the participants experience difficulties, it might be appropriate to enter the scenario earlier and offer assistance.

Simulator programming considerations				
System	Baseline state	Change in State 1	Change in State 2	Resolution
CVS	Ventricular tachycardia, pulseless	n/a *	n/a	Sinus tachycardia after three defibrillations Return of spontaneous circulation (pulses) (assume return of pulses if low-fidelity manikin)
Respiratory	Apnoeic	n/a	n/a	Return of spontaneous respirations, RR 35 (assume return of spontaneous respiration if low-fidelity manikin)
Neurologic	Unresponsive	n/a	n/a	Return of consciousness GCS = 14 (assume GCS 14 if low-fidelity manikin)
Response to participant intervention	No CPR then remains in baseline state CPR and successful use of AED go to resolution	n/a	n/a	

** For participants who perform well, the patient could be returned to VT so that prolonged CPR and multiple attempts at defibrillation are needed. However, time should be allocated in the scenario for the participants to address issues raised by the mother (faculty member).*

Debriefing points:

- individual and team performance/communication
- mother's presence at resuscitation
- communication of critical clinical issues to relatives
- timing and suitability of paediatric transfer to higher acuity setting
- prognosis post-arrest
- dealing with a parent's anger
- hospital risk management issues.

Summary

The summary session reinforces content covered in the learning activities, and is an opportunity for participants to reflect on what they have covered. No new material should be introduced.

Major points to recap in the summary include:

- teamwork principles
- individual and team performance issues
- effective communication
- communication with family members
- supporting distressed colleagues.

Participants should be encouraged to explore the literature relevant to CRM, teamwork and performance issues. They may be interested in attending further training in CRM through other complex modules or packages included in this project, or courses run by providers outside their parent institution.

Resource list

The following resource list assumes two facilitators for every 12 participants. As a minimum, the following resources are needed to conduct this module.

Resource	Quantity	Additional comments
Facilitators	2	Based on 12 participants
ARC paediatric BLS flowchart	1	For reference in introduction
Hospital paediatric BLS protocol	1	If different from ARC Guidelines
Hospital AED protocol for children	1	For educator's reference
PowerPoint presentation	1	Provided with module
Infant and child manikins	2 each	Suitable for airway management, capable of simulating VF/VT and receptive to defibrillation
OP airways	2 sets of different sizes	One for each manikin, different sizes available for different-aged children
Oxygen supply	2	May be piped or bottled
Paediatric bag-mask ventilation devices	2	
AED	2	
Paediatric AED pads	2 sets	
Feedback forms	2	As prompt for each facilitator
Evaluation forms	12	One for each participant
IV cannulae	1	Inserted in child manikin arm

Evaluation

A formal evaluation has been specifically developed for this module. It incorporates the objectives of the module and the perceptions of the participants about whether they have increased their understanding by working through the module. It is highly recommended that this formal evaluation be copied and completed by all participants at the completion of the module.

A range of informal evaluation tools may also be used in conjunction with this evaluation throughout the module, including those available in the Department of Human Services' *Clinical Skills Facilitators Manual* from the basic course conducted in 2007.

References

1. Australian Resuscitation Council Guideline 7: Cardiopulmonary Resuscitation. February 2006
2. Murray W. and Foster P. 2000 Crisis Resource Management Among Strangers: Principles of Organising a Multidisciplinary Group for Crisis Resource Management. *J Clin Anesth* 12: 633–638
3. Sundar E., Sundar S. and Pawlowski J. 2007 Crew Resource Management and Team Training. *Anesthesiology* Clin 25: 283–300
4. Meyer A., Bernard S., Smith K., McNeil J. and Cameron P. 2001 Asystolic Cardiac Arrest in Melbourne, Australia. *Emerg Med Austral* 13: 186–189
5. Donoghue A.J., Nadkarni V., Berg R.A., Osmond M.H., Wells G., Nesbitt L. and Stiell I.G. 2005 Out-of-Hospital Pediatric Cardiac Arrest: An Epidemiologic Review and Assessment of Current Knowledge. *Ann Emerg Med* 46: 512–522
6. McGahey-Oakland P.R., Lieder H.S., Young A. and Jefferson LS. 2007 Family Experiences During Resuscitation at a Children's Hospital Emergency Department. *J Pediatr Health Care* 21: 217–225
7. Dingeman R.S., Mitchell E.A., Meyer E.C. and Curley M.A. 2007 Parent Presence During Complex Invasive Procedures and Cardiopulmonary Resuscitation: A Systematic Review of the Literature. *Pediatrics* 120: 842–854

Resources

Facilitator feedback form

The following form should be used to assist you in giving feedback after each participant has practised their BLS skills at the skill station.

Feedback using the Pendleton model

Pendleton's model of feedback assists learners to maximize their potential at different stages of training, raise their awareness of strengths and areas for improvement, and identify actions to be taken to improve performance. Pendleton's rules are structured in such a way that the learner identifies the positives first, in order to create a safe environment. This is followed by the facilitator or group reinforcing these positives and discussing skills to achieve them. Different techniques are then suggested. The advantage of this method is that the learner's strengths are discussed first. Avoiding a discussion of weaknesses right at the beginning prevents defensiveness and allows reflective behaviour in the learner.

Below is a series of questions to assist you in this technique:

1. Ask the learner how they feel.
2. Ask the learner what went well and why (this can be combined with question 1 and 3).
3. Tell the learner what went well and why.
4. Ask the learner what could have been done better and why.
5. Tell the learner what could have been done better and why.
6. Summarise the learner's strengths and identify up to three things to concentrate on.

Note: This form does not need to be given to the participant — it is a guide for you, the group facilitator.

Module 5: Complex paediatric BLS—evaluation

Thank you for participating in this module. As part of our commitment to quality improvement the following questionnaire will be used to plan future implementation of this module. We appreciate your time completing this evaluation.

1. Overall

How would you rate this module?

☐ poor ☐ fair ☐ good ☐ very good ☐ outstanding

2. Learning objectives

Please consider whether this module was successful in meeting the following learning objectives:

BLS paediatric Learning objectives of Module 5: Complex BLS	Strongly disagree	Disagree	Slightly agree	Agree	Strongly agree
Reviewed the Australian Resuscitation Council (ARC) BLS Guidelines[1] for cardiac arrest in children	☐	☐	☐	☐	☐
Practised paediatric BLS as a team member in a difficult clinical setting	☐	☐	☐	☐	☐
Reflected on their ability to problem solve under stress	☐	☐	☐	☐	☐
Reflected on their ability to communicate effectively on an interpersonal level in a stressful situation	☐	☐	☐	☐	☐
Recognised factors that influence team performance	☐	☐	☐	☐	☐

3. Important learning outcomes

What are the three most important things you have learned from this module?

4. Module implementation

Please indicate to what extent you agree or disagree with each of the following statements in relation to the implementation of the module.

	Strongly disagree	Disagree	Slightly agree	Agree	Strongly agree
The facilitator respected my experience	☐	☐	☐	☐	☐
The facilitator encouraged my participation	☐	☐	☐	☐	☐
I was able to ask the facilitator questions	☐	☐	☐	☐	☐
The facilitator was able to answer my questions	☐	☐	☐	☐	☐
The feedback I received was clear	☐	☐	☐	☐	☐
The feedback I received will assist me in my future performance	☐	☐	☐	☐	☐
There was adequate time for the skills stations	☐	☐	☐	☐	☐
There was adequate time for the facilitated discussions	☐	☐	☐	☐	☐
There was adequate time for the simulations	☐	☐	☐	☐	☐
I have increased my confidence in performing paedatric BLS	☐	☐	☐	☐	☐
I have identified future learning needs in this topic area	☐	☐	☐	☐	☐

5. Future module implementation

Do you think the module should be altered in any way? ☐ yes ☐ no

If yes, what recommendations do you have?

Thank you

PowerPoint presentation

1.

Clinical Skills in Hospitals Project

Basic Life Support (BLS) Paediatric MODULE 5 'Complex BLS'

2.

Module Outline

- Discussion
- Simulation
  - Debrief
- Simulation
  - Debrief
- Summation
- Evaluation

3.

Crisis Resource Management

- Know your environment
- Anticipate and plan
- Call for help early
- Exercise leadership
- Communicate clearly
- Use all available information
- Allocate attention wisely
- Distribute workload evenly

4.

Individual Performance

- Experience and knowledge
- Situational stress
- Fatigue, tiredness
- Environment
- Negative life events
- Attitude and personality
- Drug, alcohol use

5.

Effective Teams

- Organisation
- Leadership
- Familiarity
- Designated roles
- Effective communication
- Situational awareness
- Conflict resolution

6.

Effective Leaders

- Clear communication
- Allocation of tasks
- Overseeing management
- Receptive to team input
- Situational awareness
- Prioritisation
- Positive group culture

7.

Effective Communication

- Directed and assertive
- Calm, polite, controlled
- Central relay via leader
- Verification of completed task
- Team awareness

Acronyms, abbreviations and measurements

Acronyms

A/C	assist control
AAFB	acid and alcohol fast bacilli
ABG	arterial blood gas
ACS	acute coronary syndromes
AEDs	automated external defibrillator(s)
AF	atrial fibrillation
AHA	American Heart Association
ALS	advanced life support
AMI	acute myocardial infarction
APO	acute pulmonary oedema
APTT	activated partial thromboplastin time
ARC	Australian Resuscitation Council
ASB	assisted spontaneous breathing
AV node	atrioventricular node
BBB	bundle branch block
BiPAP	bilevel positive airway pressure
BLS	basic life support
BUN	blood urea nitrogen
CABG	coronary artery bypass graft
cath lab	catheterisation laboratory
CE	cardiac enzymes
CHB	complete heart block
CK	creatine kinase
CKMB	creatine kinase Mb
CMV	controlled mandatory ventilation
CNS	central nervous system
COAD	chronic obstructive airways disease
COPD	chronic obstructive pulmonary disease
CPAP	continuous positive airway pressure
CPR	cardiopulmonary resuscitation
CRM	crisis resource management
CVA	cerebrovascular accident
CVC	central venous catheter
CVS	cardiovascular system
CXR	chest X-ray
DIC	disseminated intravascular coagulation
DKA	diabetic ketoacidosis
DKS	Damus-Kaye-Stansel [procedure]

DRABC	D: danger R: response A: airway B: breathing C: circulation
DVT	deep vein thrombosis
ECF	extracellular fluid
ECG	electrocardiogram
ED	emergency department
EMD	electromechanical dissociation
ENT	ear, nose and throat
EPAP	expiratory positive airways pressure
ET	endotracheal
FBE	full blood examination
FFP	fresh frozen plasma
FRC	functional residual capacity
g	gram
GCS	Glasgow Coma Scale
GI	gastro-intestinal
GIT	gastro-intestinal tract
GTN	glyceryl trinitrate
Hb	haemoglobin
HIV	human immunodeficiency virus
HME	heat moisture exchanger
HPS METI	a brand (Human Patient Simulator) of fully automatic, high-fidelity patient simulator
HR	heart rate
I:E ratio	inspiration-to-expiration ratio
ICF	intracellular fluid
ICP	intracranial pressure
INR	international normalised ratio
IO	intraosseous
IPAP	inspiratory positive airways pressure
IPPV	intermittent positive pressure ventilation
IV	intravenous
LBBB	left bundle branch block
LDH	lactate dehydrogenase
LMA	laryngeal mask airway
mA	milliampere
MET	medical emergency team
NBM	nil by mouth

NGT	nasogastric tube
NIMC	national inpatient medication chart
NIPPV	non-invasive positive pressure ventilation
NIV	non-invasive ventilation
NP airways	nasal prong airways
NSEACS	non-ST elevation acute coronary syndrome
NSR	normal sinus rhythm
OP	oropharyngeal airway
OTC	over-the-counter medications
PCA	patient-controlled analgesia
PCI	percutaneous coronary intervention
PEA	pulseless electrical activity
PEEP	positive end expiratory pressure
pH	the measure of the acidity or alkalinity of a solution
PICC	peripherally inserted central catheter
PIP	peak inspiratory pressure
PRVC	pressure regulated volume control
PS	pressure support
PTX	pneumothorax
QRS	wave form seen on electrocardiogram
RA	room air
RBBB	right bundle branch block
RIC line	rapid infusion catheter exchange set
RMO	registered medical officer
rPA	retaplase
RR	respiration rate
RSI	rapid sequence induction
rt-PA	alteplase
RV	right ventricular
SIMV	synchronised intermittent mandatory ventilation
SK	streptokinase
SR	Sinus rhythm
STEMI	ST elevation myocardial infarction
SVC	superior vena cava
TPN	total parenteral nutrition
UWSD	underwater seal drainage
V/Q mismatch	ventilation/perfusion mismatch
VF	ventricular fibrillation
VT	ventricular tachycardia
WCC	white cell count
WOB	work of breathing
WPW	Wolf-Parkinson-White syndrome

Chemical formulae

$CaCl_2$	calcium chloride
CO_2	carbon dioxide
$ETCO_2$	end-tidal carbon dioxide
FiO_2	fraction of inspired oxygen
H_2CO_3	bicarbonate
$MgCl_2$	magnesium chloride
$MgSO_4$	magnesium sulphate
$PaCO_2$	partial pressure of carbon dioxide in arterial blood
PaO_2	partial pressure of oxygen in arterial blood
SpO_2	percentage of oxygen saturation in blood
SaO_2	saturation of oxygen in arterial blood flow

Units of Measurement

abbreviation	unit
mmHg	millimetres of mercury
L	litre
mL	millilitre
µg	microgram — one-millionth (10-6) of a gram
mmol	millimole
J	joule
mg	milligram
cm	centimetre
m	metre