

European Pediatric Immediate Life Support

INSTRUCTOR'S MANUAL

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Lead Editor

Patrick Van de Voorde

Editors

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Frédéric Tits
Zeinab Salah
Wim Thies
Ann Verrijckt
Jef Willems
Michal Wojdak

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EPILS LIVE – provider standard program

EPILS	Advised length of session
Registration & Faculty meeting	
Introduction	10'
Recognition of the critically ill child	whole group, 30'
Embedded Knowledge & Skills stations: AB and C	4 parallel classes, 70'
Demo ABC scenario's	15'
ABC scenario's	4 parallel classes, 75'
Demo BLS	whole group, 10'
BLS basic	4 parallel classes, 60'
BLS 'AED' – 'FBAO'	2*2 classes, 60'; 1 switch after 30'

! There is 1 coffee break and a lunch/reception to schedule, as well as some time for faculty meeting and mentoring. Depending on the profile of the candidates, the course director can decide to lengthen certain topics and decrease time allocated for others. This is acceptable as long as the rationale of the chronology and the learning goals are respected.

Introduction

To the EPILS course

Information is given about:

- The focus of the course and the learning objectives: **being able to stabilize a sick child during the first 5' after encounter, awaiting the arrival of a resuscitation team.**
- The format of the course: interactive and performance-based; building upon the knowledge from the pre-course training and the participant previous experiences.
- The course runs over approximately 5h, including both recognition and initial stabilisation of a critically ill child and subsequently basic/intermediate life support in case of a cardiac arrest. Five hours is short but should be sufficient to get the main messages across. Depending on the target population and the level of preparation the program can be lengthened accordingly (never to exceed 9 hours). Still, clear choices are made in terms of what is trained (in view of the course objectives). To be able to meet these goals time management during the course is crucial. Additional questions, not part of the sessions, can always be discussed in the breaks or might be answered on the learning platform.
- Participants are clustered in groups of maximum six. Each group will have two mentors, who will be available for advice, open for questions, aid when there are problems...
- The importance of TEAM training, equally for ILS:
 - In our case often these teams are made 'ad hoc' and do not have a long history of working together
 - Importance of 'communication' e.g. use each other's names
 - 'Shared mental models': in our case ABCDE
 - 'Cross-role' training: each participant takes up different roles regardless of their real-life profession...
- The course is part of a continuum. Knowledge and skills rapidly decline if not regularly retrained. Retraining should be done at the local level (in-hospital mock codes) but ERC offers as part of this course and certification a platform for on-going learning – retraining and recertification.
- It is also important to remember that the well-known **Formula for Survival** incorporates *Science and Education* but also *Implementation*. The latter is hospital specific and everyone's shared responsibility.
- "There is no formal testing, but we will follow your knowledge, skills and performance closely (continuous assessment) during the coming 5 hours. We expect no one well-prepared and actively involved during the course to fail."

Each information moment should end with the possibility for the candidates to ask burning questions.



ADDITIONAL INSTRUCTOR INFORMATION

- *This instructor part gives a clear structure for each session; the answers to the given questions are to be found in the CoSy course content/provider manual **(and should be known to all instructors)**. Stick closely to the content of this instructor manual and the EPALS provider manual -as well as all abbreviations used-. Do not overload the session with details but take sufficient time to teach the core issues and predefined goals for each session.*
- *Content that is on the CoSy but not further described in this instructor part should always be considered as 'optional'. It is the course director who will decide in how far 'optional' content is given as part of the EPILS course, depending on the characteristics of the participants.*
- *Questions mentioned in this manual should be used only as aids during demonstrations when appropriate and not during hands-on practice because they risk to interfere and/or interrupt the flow of actions. However, as part of their pre-course preparation, instructors must prepare to be able to answer those questions (and others).*
- *At the end of each session, candidates should be given a formal opportunity to ask any questions. When these have been answered to the candidates' satisfaction, the respective session can be closed by repeating the procedures used. However, if certain questions are beyond the scope of the EPILS course or take too much time to answer, these might be postponed to lunch or mentoring moments.*
- *As an instructor you give advice and, by means of focused feedback (**learning conversation**), correct and direct the candidate toward the predefined goals of the session. Assessment of the achievement of these goals by each of the individual candidates is an important part of the role of the instructor.*
- *Given the maximum length of the LIVE course -ideally about 5 hours (max 9h) training time per course- it is imperative to have a good time management and closely stick to the time scheduled. There should always be sufficient additional time for lunch and coffee breaks as these are also group moments, time for questions, mentoring, faculty...*

Although we provide a standard 5 hours program, alternative programs might be used at the discretion of the course director as long as certain rules are respected and confirmation by the EPILS International Course Committee is given.

Session 1.

Recognition of the critically ill child



ADDITIONAL INSTRUCTOR INFORMATION

whole group – tutorial - 30'

Material/class: flipchart or board (optional: a few supporting slides)

The whole session is build up around one specific case of cardiorespiratory failure. The candidates need to identify the questions they need to ask themselves when confronted with a severely ill child. The instructor assists the candidates to come to a final algorithm (see manual fig 1.5), highlighting the acronyms used as memo-technical aids and the continuum of compensation and decompensation. This is not a discussion session. The instructor builds on the knowledge the candidates already have after the pre-course preparation. If this preparation was not sufficient for some reason, than more time might be needed to finish this session.

CASE: 9 month-old Lucy has 'breathing difficulties'. She is crying and breathing rapidly. T° 37.8° C

How to start?	<ul style="list-style-type: none">• Observation 'Quick Look' (BBB) identifies a child at risk• Any case that is potentially 'in danger' should be further evaluated using SSS-ABCDE
What if this child was unconscious?	Check for other signs of life... (absence leads to arrest algorithm)
How to evaluate <u>Airway</u> patency?	<ul style="list-style-type: none">• Look, listen, feel: when is the airway likely to be free?• Free & safe? At risk? Obstructed?
How to support?	<ul style="list-style-type: none">• Open [Position – head tilt – chin lift] – aspirate (if necessary e.g. thick secretions) – airway adjuncts?• Assess – treat – reassess. Anticipate problems!
<i>Lucy's airway is free, some secretions</i>	
What is '<u>breathing</u>'?	<u>Oxygenation & ventilation</u> are two interacting but separate parts of B.

<p>How will a child look when it has early signs of respiratory failure?</p>	<p>Look for RWTO:</p> <ul style="list-style-type: none"> • Rate (normal values - evolution); too fast or too slow (fatigue, neurologic disorders). • Work of Breathing (signs); Respiratory failure can be without respiratory distress. • Tidal Volume (including auscultation: symmetry, breathing sounds...) - rising chest does not guarantee air-entry. • Oxygenation (SpO_2, cyanosis).
<p><i>Lucy has a RR of 45'/, increased work of breathing, good air entry, some crepitation and slight wheezing on auscultation, SpO_2 is 93 % on air.</i></p>	
<p>How and when to support oxygenation here?</p>	<p>Initial 100 %, afterwards titrated in view of SpO_2. No details here on how to deliver FiO_2.</p>
<p>How and when to support ventilation here?</p>	<p>Assess – treat – <u>reassess</u>. Anticipate! No details on BMV here.</p>
<p>What will happen if Lucy decompensates? How then to support?</p>	<ul style="list-style-type: none"> • Signs of decompensated respiratory failure. • Importance of early support to avoid decompensation.
<p>What is 'Circulation'?</p>	<p>Perfusion – Tissue oxygenation</p>
<p>How will a child look when it has early signs of circulatory failure?</p>	<p>5P:</p> <ul style="list-style-type: none"> • Pulse/Heartrate (normal values - evolution). • Pulse Volume (distal vs. central). • Peripheral perfusion (signs, including renal). Circulatory failure can exist with normal capillary refill and bounding pulses (vasodilation). • Preload (signs of 'backward failure'). • Blood pressure (normal values, importance of 'mean').
<p><i>Lucy has a HR of 170'/, no signs of decreased perfusion or increased preload, BP is normal for age.</i></p>	
<p>What will happen if this worsens? How then to support?</p>	<ul style="list-style-type: none"> • Signs of decompensation • Assess – treat – reassess. Anticipate! • No details on treatment possibilities...

<p>How to evaluate endangered Neurology, meaning the <u>brain</u>?</p>	<p>Evaluate level of consciousness: AVPU?</p> <ul style="list-style-type: none"> • Asymmetry? • Evaluate pupils • Are there convulsions? Signs of imminent herniation? • Check Glycemia (no further detail about neuroprotective care here).
<p>'Environment': What is the minimal info needed to assist stabilization?</p>	<ul style="list-style-type: none"> • What is the reason for encounter? Why are the parents worried? • Does the child have pain or discomfort? • AMPLE (relevant for trauma, but also for other cases).
<p><i>Final evolution is towards cardiorespiratory failure:</i></p> <ul style="list-style-type: none"> • <i>At the level of tissue and organ this will lead to a mismatch between O₂ delivery and O₂ consumption.</i> • <i>This results in anaerobic metabolism and lactic acidosis.</i> • <i>Initially brain and heart are protected by compensation but when this fails the evolution towards agonal breathing (gaspings) & bradycardia is fast (resulting in cardiac arrest).</i> • <i>Thus, the prognosis depends on prevention, early recognition & appropriate resuscitation.</i> 	
<p><u>Session ends with an overview of the algorithm (manual figure 1.5): as a slide or on a board... (or CoSy video on recognition)</u></p>	

Session 1

Recognition of the critically ill child

Session 2.

ABC embedded knowledge and skills



ADDITIONAL INSTRUCTOR INFORMATION

4 parallel, small classes of 70' or 2 classes of 35' each, switching one time. This session always comes after the recognition tutorial, but before ABC scenarios.

Material: board or flipchart; ALS baby or junior (to accommodate airway adjunct); various sizes of bags and masks; sizes of oropharyngeal and nasopharyngeal airways (or shorten tracheal tubes with safety pins); suction equipment; different types of oxygen devices (nasal prongs, masks, non-rebreathing masks with valves...). IO needles (optional); Peripheral catheters, syringes, fluids (250 mL or 500 mL 0,9 % NaCl; Gloves/aprons – cleaning material.

*A story line is used (to situate learning and increase motivation) and when needed the instructor calls for a time out to practice a skill (this can be done in smaller groups). Ideally the instructor leading the scenario differs from the one leading the time out practice training. **Always focus on systematic ABCDE approach, using knowledge of the recognition tutorial!***

Stick closely to the content underneath. Do not overload the session with details but take sufficient time to teach the core issues -as described underneath- for each session. Keep your timing.

LEARNING GOALS: At the end of this session the candidate should know:

- how to open and sustain an airway, including the use of an oropharyngeal airway;
- how and when to deliver oxygen;
- how and when to perform bag-mask ventilation;
- what to consider and how to react when bag-mask ventilation fails;
- what different types of shock exist and how this affects treatment;
- how and when to give fluid in shock;
- how to recognise and respond to arrhythmia
- how to prepare and administer adrenaline during resuscitation

CASE 1: 6-month Tony is ill from bronchiolitis. He has some difficulty with breathing. The general practitioner refers him to the ED.

Observation 'Quick Look' (BBB) identifies a child at risk.

This child is potentially in danger, so the only way to approach is ABCDE. One candidate again describes in short how to recognize respiratory failure (do not go into detail as this was already done in the previous session).

The first thing to do is evaluate and support the Airway. This is still normal. (head tilt-chin lift will be practiced during BLS).

The instructor shortly points out the difference between oxygenation and ventilation.

**TIME-OUT:
oxygen delivery**

How to administer – how to monitor: devices (nasal prongs, oxygen mask, high concentration mask), indication, flow; FiO₂; PEEP; SpO₂ and clinical signs.

The case continues with evaluation of C and D. Both are still normal. The need for IV access has to be weighed against the concept of 'minimal touch'. Finally, E is considered. Causal emergency treatments are part of this evaluation.

One other candidate is then asked to describe what will happen if Tony deteriorates. What are signs of decompensation? What to do?

**TIME-OUT:
bag-and-mask
ventilation**

- Devices (bags, valves, masks...): (dis)advantages of different devices, choice of mask; role of valve
 - risk of hyperventilation?
 - how to allow spontaneous breathing?
 - how to evaluate effectiveness of ventilation?
 - potential reasons for ineffective ventilation?

DOPES can also be used to identify reasons of sudden deterioration or failure (Displacement e.g. Mask leak; Obstruction e.g. airway positioning; Pneumothorax, Equipment, Stomach)

- Technique (E-C clamp)

EACH CANDIDATE PRACTICES BMV up to the point they are doing it (near) perfect.

What if it is not possible to perform adequate ventilation with single-rescuer BMV?

- Positioning (airway); 2-person BMV technique; jaw thrust (also preferred in case of trauma).
- oro- or naso-pharyngeal airway; indications and (dis)advantages; sizing and insertion.

EACH CANDIDATE PRACTICES both techniques (2-person BMV - Airway adjuncts)

CASE 2: One-year-old Lucy is admitted to Emergency department by her parents. She is not being well, crying and having high fever (39 °C).

This child is potentially in danger (quick look), so the only way to approach is ABCDE. Again do not linger too much on ABCDE as such as this was done in the recognition session.

The instructor starts with the evaluation of AB; A is open but at risk; the child shows rapid but sufficient breathing, respiratory rate is 40', SpO₂ is 92 %. There is a need to give Oxygen (100%).

The candidate then evaluates C (5P): HR 170/min, BP 85/40 capillary refill 2s, warm skin, bounding pulse.

Recognition of circulatory failure. How to monitor?	<ul style="list-style-type: none"> • Compensation – Decompensation continuum • Monitoring: clinical, ECG, blood gas - lactate, urinary output...
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How to support here?	<ul style="list-style-type: none"> • Assess – treat – reassess. Anticipate problems • Vascular access (what are the possibilities?) • Fluid: which? How much (being cautious – reassess after); how to prepare?
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OPTIONAL (depending on target public): insertion of EZ-IO

The case continues with evaluation of D, which is still normal. Glycemia is high. Finally, E is considered. Causal emergency treatments are part of this evaluation.

What are causes of shock (in this case and in general, no details)? How do they affect treatment?	<ul style="list-style-type: none"> • Septic (both with vasoconstriction or vasodilation). • Anaphylaxis: IM adrenaline should be emphasized. • Hypovolemic/Haemorrhagic. • Cardiogenic – Obstructive. <p><u>Without going into detail</u> (as this is part of local protocols) the importance of e.g. early antibiotics in sepsis is emphasized.</p>
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What will happen if Lucy deteriorates? What are signs of decompensation?

Decompensated shock: how to support?	<ul style="list-style-type: none"> • AB: Airway is opened...; Oxygen is given with non-rebreathing. BMV is considered, once ventilation becomes insufficient. • Intubation and premedication in case of decompensated shock is indicated but is also a dangerous thing to do. • C: access (if not already); Fluid (place of blood products) • Vasoactive drugs (when, which, how); without further detail
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In case of cardiac arrest, adrenaline will be used in bolus. Without going into detail about the ALS algorithm, take some time to explain how this is then prepared... In view of time this can also be added to the BLS session later.

What if Lucy presented with tachycardia 240/min?	<p>This could be a primary arrhythmia (SVT). Explain the difference with a secondary arrhythmia (like ST).</p> <p>Adequate support as above is needed but also early help in view of cardioversion...</p> <p>In case of any arrhythmia always first evaluate whether or not there are any <u>signs of life!!</u></p>
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What if Lucy presented with the same symptoms but a history of massive gastrointestinal bleeding?	<ul style="list-style-type: none"> • What is the reason of the shock then? Does this have consequences for the treatment choices made? • The instructor in short explains the importance of surgical input and early blood products.
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Session 2

ABC embedded knowledge and skills

Session 3.

Demo + intermediate ABC scenarios



ADDITIONAL INSTRUCTOR INFORMATION

Demo 15' whole group + afterwards scenario 75' small classes

Material: BLS/ALS manikins (junior and baby), gloves, Non-rebreathing masks, Guedel airways, Bag and masks, NaCl 0.9 % 500 ml; SpO₂ probe – monitoring. Different types of oxygen devices (nasal prongs, masks, non-rebreathing masks with valves...). Peripheral catheters, syringes, fluids (250 mL or 500 mL 0,9 % NaCl; gloves/aprons– cleaning material.

All scenarios are built on the rapid ABCDE assessment of the manual. The candidate receives a short clinical scenario.

Candidates should further ask questions or ask for monitoring to obtain additional information or values of parameters (that are not visible...). Parameters will be available once the candidate monitors them or acts to obtain them (e.g. auscultation, blood pressure...). Safe approach in-hospital means airway barriers, gown, gloves, masks if required.

Scenarios and scenario circumstances should be plausible (roles and circumstances) and feasible. Don't correct during scenarios and avoid too much talking on behalf of the instructor. To do so, we divide the work between 2 instructors:

- One leading the scenario and afterwards the feedback, only giving info that is not visible 'clinically or on screen' (take care to avoid 'prompting');*
- Another instructor writes down on a dashboard (electronic e.g. iPad – PC or on a whiteboard) all 'monitor' info and alters this info according to the scenario progression.*

None of the scenarios should evolve to cardiac arrest. *If the approach of the candidate is thus that the scenario continues to deteriorate the instructor should call for a time-out to correct and feedback, looking for clues and reasons why this is happening (as by 'learning conversation'). From an educational point of view it is never very wise to let a scenario get 'out-of-control'.*

DEMO

The session starts with a demo for the whole group that uses the same approach as the subsequent scenario training, but with an instructor as 'candidate'. Use a scenario from the ones underneath e.g. scenario 2.

Demos are presented in a way to diminish barriers and fear – to make the candidate at ease with the format- and to emphasize important knowledge and skills used during the scenarios. *Demos are always perfect examples of how to handle a scenario. Rehearsal is therefore mandatory before the effective demo.* The demo should end with a summary of the situation by the candidate but NOT with an evaluation of the actions made by the candidate. However, if it happens that certain things are done 'suboptimal' during the demo, these of course need to be pointed out so that there is no incorrect learning...

INTERMEDIATE ABC SCENARIOS

In respiratory and circulatory failure scenarios, each candidate will act as team leader with only a small team (one or max. two 'helping hands'). They will take decisions and coordinate the scenario. Other candidates will act on direct orders from the team leader. The focus in these ABC intermediate scenarios is on the recognition, assessment and initial stabilization and not on team work and interaction (however proper communication is always a key issue).

One instructor tells the story and gives the information that is not visible when asked or when the candidate acts to obtain them. Visible 'monitor' information is added to an electronic screen or a whiteboard by the second instructor (if available). Each scenario has different pre-defined states, which can be reached when certain actions are done or not done. In reality parameters would be more variable but we can make abstraction of this and use semi-continuous states instead, without diminishing plausibility and feasibility of the scenario as such.

Scenario should last about 5' ('FIRST FIVE MINUTES') with an additional few minutes for structured feedback (see addendum 'learning conversation').

Try not to correct during scenario's and avoid prompting (giving information that helps to identify the problem or appropriate responses and/or pushing the scenario in a certain direction).

End each scenario with a hand-over to the arriving team (of instructors)!

RSVP is proposed for handover in the context of 'emergencies'.

Do not forget to start with an Identification of yourself and the patient.

The **R** stands for **reason**: why are you calling, what's the acute problem.

The **S** then stands for **story**: the short history and circumstances leading to the current incident; actions performed by the team up till now...

V for **vitals** identifies the *current* vital parameters and relevant patient results.

Finally, **P** indicates the need for a **plan**: what is expected from the accepting team, what the referring team can do in the meantime.

SCENARIO TRAINING: The first scenario in each class room will be the repeat scenario of the demo (e.g. scenario 1). There should be time for at least 6 scenarios.

SCENARIO 1: 6w OLD JOEY		NORMAL VALUES
<p>You have just admitted a baby who has been sniffy, had a cough and been off feeds for 3 days. Mam calls you to the room because she thinks her son is deteriorating. One of you is the team leader, the other one helps as asked.</p>		KG 5 RR 35-55 HR 100-150 (< 175/) BP syst 63 (> 53)
STATE 1 (initial)	QUICK LOOK: B- B- B-	
	CLINICAL A partially obstructed, lots of secretions B severe distress, bilateral wheezing, tachypnoea, cyanosis C CR 4"; mottled and pale; cold extremities; weak distal pulses; liver 1 cm, jugular flat. D less interaction	MONITOR AB RR 70/min, SpO ₂ in air 70 % C HR 180/min, SBP 80
EXPECTED ACTIONS	A: open AW & keep open (including suctioning secretions). B: FiO ₂ 100 %; auscultation; deliver BMV and assess effectiveness *1 C: IV access; crystalloid 20 ml/kg *2*3	
EVOLUTION	*1 If no AB stabilization: parameters remain the same (eventually time out, because cardiac arrest is near). *2 If AB stabilization but no fluid bolus: more alert; less WOB, SpO ₂ to 94 %; HR 172/' BP 80/45mmHg, CR remains 4". *3 If also fluid bolus: normalization.	
ADDITIONAL REMARKS FOR INSTRUCTOR <ul style="list-style-type: none"> • Case of bronchiolitis with decompensated respiratory failure and mild hypovolaemia. • Emphasis on quality of BMV; importance of reassessment. • (Optional) place of blood gas analysis, glycaemia, electrolytes; need for intubation, how to prepare, what are the risks... 		



SCENARIO 2: 2 y OLD RACHEL		NORMAL VALUES
<p>Rachel complains of feeling unwell after receiving a dose of antibiotics. She progressively develops urticaria, swelling of the lips and abdominal pain. Her breathing becomes 'difficult'. You are the one in charge. You have one colleague to help you.</p>		<p>KG 12 RR 25-30 HR 70-120 (< 160/')</p>
STATE 1 (initial)	<p>QUICK LOOK: B- B- B-</p>	
	<p>CLINICAL</p> <p>A partially obstructed, no secretions</p> <p>B severe WOB, wheezing and stridor bilateral</p> <p>C CR 1"; warm and flushed; weak peripheral pulses</p> <p>D AVPU, drowsy</p>	<p>MONITOR</p> <p>AB RR 45/'; SpO₂ in air 93 %</p> <p>C HR 145/'; BPs 70</p>
EXPECTED ACTIONS	<p>SSS – A: open AW & keep open (ask expert help!)</p> <p>B: FiO₂ 100 %; (no BMV currently needed); auscultation – IM ADRENALINE *1</p> <p>C: IV access; crystalloid bolus 20 ml/kg</p>	
EVOLUTION	<p>1* If no adrenaline: further decrease in SpO₂ 83 %, HR 170/'; BP 60/30mmHg</p>	
<p>ADDITIONAL REMARKS FOR INSTRUCTOR</p> <ul style="list-style-type: none"> • Discuss anaphylaxis and the need for immediate adrenaline IM • Discuss difficult airway and the need for early expert help; place of BMV? 		

SCENARIO 3: 16M OLD ROSS		NORMAL VALUES	
<p>A 16-month old infant is seen at the consultation. The mother reports that the child is having watery diarrhea and vomiting the last 2 days. He is sleepy and does not eat any more. There is no fever.</p>		<p>KG 13 RR 20-30 HR 70-110 (< 165/')</p> <p>BP syst 95 (> 75)</p>	
STATE 1 (initial)	<p>QUICK LOOK: B- B+ B-</p>		
	<p>CLINICAL</p> <p>A at risk</p> <p>B pale, normal auscultation, some tachypnea</p> <p>C very weak distal pulses, proximal pulses present, cold extremities, CR5", no signs of increased preload</p> <p>D only reacts to pain, no interaction with parents</p>	<p>MONITOR</p> <p>AB RR 60/min, SpO₂ in air 91 %</p> <p>C HR 198/min narrow complexes, SBP 65</p>	
EXPECTED ACTIONS	<p>SSS - A - B: AW open, FiO₂ 100 %; auscultation</p> <p>C: IV access + 20 ml/kg crystalloid. 3 boluses needed eventually.</p>		
EVOLUTION	<ul style="list-style-type: none"> • If proper ABC, including first fluid bolus: HR 180/' – SBP 75 – CR 4". • If subsequent fluid boluses: return to normal. • If no fluid bolus: situation remains unchanged. • If treatment of tachycardia by drugs or cardioversion, if use of inotropes instead of fluids, if use of glucose or bicarbonate instead of fluids: call for time-out. 		
<p>ADDITIONAL REMARKS FOR INSTRUCTOR</p> <ul style="list-style-type: none"> • Diagnosis of hypovolemic shock. • Fluid therapy: place of crystalloids, glucose, bicarb and vasoactive drugs? What if sepsis but no signs of shock? • Avoid repeated attempts for IV line – IV line needs to be proper or IO is preferable. 			



SCENARIO 4: 6M OLD MONICA		NORMAL VALUES				
<p>A 4 month old infant arrives at the consultation. The mother reports that the child is irritable since the day before, isn't eating properly, is sweating and is not' doing very well. No fever.</p>		<p>KG 6 RR 30-45 HR 90-120 (<175/'') BP syst 75 (>65)</p>				
STATE 1 (initial)	<p>QUICK LOOK: B+/- B- B-</p> <table border="1"> <thead> <tr> <th>CLINICAL</th> <th>MONITOR</th> </tr> </thead> <tbody> <tr> <td> <p>A Patent</p> <p>B moderate intercostal retractions, nasal flaring. Symmetrical air entry.</p> <p>C cool extremities, mottled, CR4", jugular visible, liver 2-3 cm</p> <p>D alert, cries</p> </td> <td> <p>AB RR 60/min, SpO₂ in air 92%</p> <p>C R 230/min narrow complexes, SBP 80</p> </td> </tr> </tbody> </table>	CLINICAL	MONITOR	<p>A Patent</p> <p>B moderate intercostal retractions, nasal flaring. Symmetrical air entry.</p> <p>C cool extremities, mottled, CR4", jugular visible, liver 2-3 cm</p> <p>D alert, cries</p>	<p>AB RR 60/min, SpO₂ in air 92%</p> <p>C R 230/min narrow complexes, SBP 80</p>	
CLINICAL	MONITOR					
<p>A Patent</p> <p>B moderate intercostal retractions, nasal flaring. Symmetrical air entry.</p> <p>C cool extremities, mottled, CR4", jugular visible, liver 2-3 cm</p> <p>D alert, cries</p>	<p>AB RR 60/min, SpO₂ in air 92%</p> <p>C R 230/min narrow complexes, SBP 80</p>					
EXPECTED ACTIONS	<p>SSS – A – B: AW open, FiO₂ (nasal or free flow in view of tolerance); auscultation</p> <p>C: IV access (if possible) +</p> <p>Determine need for cardiology input *1*2</p>					
EVOLUTION	<p>*1 If adenosine or electrical cardioversion without proper preparation: call for time-out.</p> <p>*2 If waiting for expert help: status quo.</p>					
<p>ADDITIONAL REMARKS FOR INSTRUCTOR</p> <ul style="list-style-type: none"> • Diagnosis of SVT (cardiogenic shock). • Indications for cardioversion; in case of severe instability need for electrical cardioversion. • Avoid repeated attempts for IV line. 						

SCENARIO 5: 8y OLD CHANDLER		NORMAL VALUES
Chandler is referred to your hospital by his GP for observation after a fall from a tree (2m high but head first). He is vomiting but alert. When you return for a check, the boy is however not very well reacting - nearly comatose.		KG 25 RR 20-25 HR 65-100 (< 120) BP syst. 105 (> 85)
STATE 1 (initial)	QUICK LOOK: B- B- B+/-	
	CLINICAL A at risk, no secretions B irregular, grunting, no WOB C CR 2", a bit pale D fever; pupil large; AVPU	MONITOR AB SpO ₂ 89% in air C HR 68', BPs 126
EXPECTED ACTIONS	SSS-A: open AW & keep open; ask for help incl. neurosurgeon B: FiO ₂ 100 %; BMV; auscultation *1 C: IV access DE: (glycaemia tested) *2	
EVOLUTION	*1 If A or B INSUFFICIENTLY TREATED: further decrease in SpO ₂ 83 % *2 Need to contact neurosurgery ASAP; intubation if experienced helper	
ADDITIONAL REMARKS FOR INSTRUCTOR <ul style="list-style-type: none"> • Discuss signs of intracranial hypertension – risk of ic bleeding after minor head injury • Brain protective care; importance of early treatment 		

SCENARIO 6: 3M OLD PHOEBE		NORMAL VALUES
<p>A 3-month old infant is admitted. The mother reports that the child is having watery diarrhea and vomiting the last 4-5 days. He looks very ill and is not eating any more. There is no fever. The child starts convulsing once you are in the room.</p>		<p>KG 6 RR 30-45 HR 90-125 (< 175/')</p> <p>BP syst 70 (> 58)</p>
STATE 1 (initial)	QUICK LOOK: B- B+/- B-	
	<p>CLINICAL</p> <p>A at risk</p> <p>B pale, normal auscultation, tachypnea</p> <p>C weak distal pulses, proximal pulses present, mottled, CR4", no signs of increased preload</p> <p>D convulsing</p>	<p>MONITOR</p> <p>AB RR 50/min, SpO₂ in air 96 %</p> <p>C HR 190/min narrow complexes, SBP 80</p>
EXPECTED ACTIONS	<p>SSS-A-B: AW open, FiO₂ 100%; auscultation</p> <p>C: proper IV access is <i>not immediately possible but some blood can be taken</i></p> <p>DE: Benzo IM or intranasal/intrabuccal (optional) *1 *2 *3</p>	
EVOLUTION	<p>*1 If proper ABC and benzo: HR 170/' – SBP 85 – CR 3"</p> <p>*2 Once benzo, IV access is possible: if fluid bolus but no diagnosis of hypoglycemia: status quo</p> <p>*3 Need to diagnose hypoglycemia and treat before - normal</p>	
<p>ADDITIONAL REMARKS FOR INSTRUCTOR</p> <ul style="list-style-type: none"> • Case of hypoglycemia after dehydration and fasting in infant with an underlying condition • Do not forget glucose! • How to treat seizures – time critical 		

Session 4.

BLS / ILS



ADDITIONAL INSTRUCTOR INFORMATION

*1 demo whole group 10'; Then 4 classes parallel 60'; finally 2*2 classes each 30'*

Material (per class): 2 BLS Manikins (one infant and one junior), cleaning material, Teaching-purpose AED (in the 2 AED classes), different types and sizes of self-inflating bags and masks.

Every demo should always be rehearsed. Suboptimal demo's lead to suboptimal candidate performance.

In case there are insufficient manikins for the 4 classes then 2 classes start with the infant and 2 with the junior, after which the manikin switch classes.

LEARNING GOALS: At the end of this session the candidate should know:

- *how to recognise cardiac arrest;*
- *how to perform high quality BLS in an infant and in a child, including the use of BMV;*
- *how to prepare adrenaline for use in the ALS algorithm (if not already);*
- *when and how to use an AED in paediatric cardiac arrest cases;*
- *how to react in case of foreign body airway obstruction;*
- *how to place a child in a recovery position.*

BLS DEMO: 10'

- **STAGE 1:** The instructor first performs a silent BLS scenario of a baby, starting with the evaluation of S-S-S. Head tilt – chin lift. Evaluation of 'signs of life'; no pulse check. High Quality CPR (rate, depth, hands-off time). After 1' the instructor calls 112 using the speaker function of their mobile phone, after which he/she restarts BLS (with airway..)
- **STAGE 2:** The instructor performs a second time the BLS scenario of a baby but now with vocal description of the actions performed. Emphasis is given on S-S-S; adequate airway opening; gasping; 'signs of life'; adequate chest compressions; 112 call and finish with a restart of sequence.
- **STAGE 2bis:** The instructor performs finally the BLS scenario of a child with vocal description of the actions performed (and the differences with the baby). Emphasis is given on S-S-S; adequate airway opening; gasping; 'signs of life'; adequate chest compressions; 112 call and finish with a restart of sequence.
- The possibility is given to ask 'burning' questions but it is indicated that most of it will clarify itself further during the subsequent sessions.

BLS 'BASIC' KNOWLEDGE & SKILLS: 60'

One instructor performs BLS for the baby and is guided by vocal instructions from 1 of the candidates.

Afterwards this candidate performs BLS infant. The other candidates observe.

Some comments can be given during the candidate's performance provided the candidate is allowed to progress into the sequence (e.g. if the candidate is unable to open the airway and to demonstrate visible chest movement: the instructor may help the candidate to correct head position allowing him to continue progressing into the sequence.) After the candidate has completed the sequence some additional feedback can be added. The differences in BLS between older children and infants are explained. The importance of BLS quality -in terms of airway opening; compression rate, depth, recoil; hands-off time- is emphasized.

The following questions are briefly discussed:

- What are the most frequent causes of cardiac arrest in young children? And what with older children?
- Which sequence of EMS activation should be used? What in case of sudden witnessed collapse?
- What are the causes and what should you do if the chest does not rise? (FBAO = next session)
- What is meant by 'signs of life' and why is this important? What is meant by 'gaspings'?
 - 'Pulse check' is not considered to be part of BLS (in ALS it is optional but even then discouraged).
 - The risk of doing chest compressions in patients that are not in cardiac arrest is very low.

Afterwards candidates have time to practice the BLS of an infant and BLS of a child.

BABY

- 1 rescuer: mouth-to-mouth and nose, 2-finger chest compressions
- 2 rescuers: BMV; encircling for compressions

CHILD

- 1 rescuer: mouth-to-mouth, 1 or 2 hands for compressions (optional 30:2)
- 2 rescuers: BMV; 1 or 2 hands for compressions (15:2)

If one of the candidates has problems with technique or algorithm this needs to be identified and remediated before the end of the day.

After this, the story line continuous with a 1y old child who had a cardiorespiratory arrest on the ward. The team performs BLS with BMV upon arrival of the ALS team (being the instructor).

The following questions are discussed:

- *what information needs to be given to the ALS team (history, CPR times..)*
- *what is the first thing the ALS team will do once taken over?*
- *what is the difference between a shockable and non-shockable rhythm? Impact on algorithm*
- *what can you do once the ALS team has taken over (assist in chest compressions, prepare adrenaline..)*
- *how to prepare and give adrenaline during CPR*
- *what are important things when a child needs defibrillation (safety, minimal hands-off time)*

ILS 'INTERMEDIATE' KNOWLEDGE & SKILLS: 2*2 CLASSES OF 30' EACH, ONE-TIME SWITCH:

CLASS 1: AED

Two instructors do a silent demonstration of a BLS scenario of a child. One starts BLS of the child, the second instructor calls for help and brings an AED; the AED is attached after one-minute CPR. The rhythm is non-shockable and BLS is immediately restarted before the scenario stops.

The instructors then repeat the sequence but with vocal explanation of the actions performed. Attention is given to the timing of AED introduction (one vs. two rescuers), the proper use and the related safety issues.

The following questions are briefly discussed:

- What are the most frequent causes of cardiac arrest in children and for which of them an AED would be beneficial? The concept of 'sudden witnessed collapse' is explained.
- What are the risks and limitations of current AED's? Are these age-related (< 1 year, < 8 year...)? Context-specific (e.g. swimming pool...)?

Afterwards the candidates have time to practice the BLS of a child with use of AED. Rotate so that in the end each candidate has been able to work with the AED.

Case 1: 11y old child after a sudden witnessed collapse at the cardiology consultation.

First mouth to mouth, then BMV is applied (optional alternative: adult algorithm). An AED is available for use and needs to be attached after 1'. The rhythm is shockable. The case ends after one shock has been given and CPR restarted.

- How long will CPR continue before a new rhythm evaluation? Why is CPR restarted?
- When is there a new rhythm check?
- Beware non-shockable can become shockable (and reverse).

Case 2: 6y old has a cardiac arrest on the ward. He is known with renal failure.

First mouth to mouth, BMV is applied when available. An AED is brought in after about 1 minute and needs to be attached. The rhythm is shockable. The case ends after one shock has been given and CPR restarted.

- Do you know about 4H4T (and e.g. stop a potassium infusion running)?
- If a monitor is attached the difference between shockable and non-shockable can be seen and thus the need for an AED (or defibrillator) is more clear. Remember that non-shockable can become shockable (and reverse).

Case 3: a 9M old child has a cardiorespiratory arrest on the ward after a prolonged apneic event.

An AED is available for use and will be attached after 1'. The rhythm is non-shockable.

- Once the resuscitation team arrives one candidate is asked to prepare adrenaline.

ILS 'INTERMEDIATE' KNOWLEDGE & SKILLS; 2*2 CLASSES OF 30' EACH, ONE-TIME SWITCH:

CLASS 2: FBAO

A 4-year-old child is playing with his 16-month old brother. Suddenly the little boy is coughing then the cough becomes silent. The 4 year old calls his 'nanny'.

An instructor will act as the rescuer/nanny. Once the scenario reaches the state of 'ineffective cough' the instructor starts choking maneuvers according to the child age.

Together with candidates the CHOKING algorithm is completed. Some additional clarifications are given.

- How to recognize a presumed foreign body aspiration?
- Manoeuvres will depend on: Conscious or not? Effective coughing or not?
- How long to continue the maneuvers? When to try and extract a foreign body from the airway? When to call for help?
- Differences between child and infant?

Abdominal thrusts, Chest thrusts and Back blows are demonstrated for both infant and child.

Afterwards candidates have time to practice different scenarios.

- FBAO infant 'ineffective cough'; ending with loss of signs of life
- FBAO child 'ineffective cough'; ending with loss of signs of life

BACKGROUND FOR INSTRUCTOR: LEARNING CONVERSATION

The central aim of the learning conversation is to promote and support greater self-awareness of the individual student and develop competence and team leadership. Learning, particularly in the context of resuscitation is demonstrated to us by a change of behaviour and the process is facilitated by feedback whether during skills teaching, in workshops or in simulation. The learning conversation is an empathic, respectful listening and advising conversation between adults.

Adults are independent learners and generally choose to learn what they feel is relevant to them. They construct their learning on what they read, see and do and the degree of retention depends on their perspective of what is useful. Such self-organised learning creates meaning from experience.

The learning conversation aims to help this process using a facilitator or mentor and peers and promotes reflective practice through reflection on action, both by the lead individual and by the team. In turn, simulation can be revisited, explored and linked with prior knowledge, promoting higher levels of activity within the cognitive domain leading to deeper learning. This organised 'talk-back' is a discussion to identify key points for learning, to correct errors, questioning and promoting effective understanding. The support of a good team for this process helps maintain the self-esteem of the individual candidate.

• The process

- The process itself needs to be started with an opening remark to encourage the candidate to tell their concerns. Feedback needs to promote self-reflection and group reflection, ideas, suggestions and collaboration.
- The conversation requires both the facilitator and the learner to be:
 - reflective
 - attentive
 - active listeners
- The facilitator gains an impression of the learner by inquiry and then offers their frame of understanding back to the learner. This process of 'Advocacy with Inquiry' offers a mirror of understanding with which the candidate can concur or refute.
- This exploration requires patience as the candidate needs to reflect and then tell their narrative. Both the mentor and candidate seek to bring the candidate's knowledge to the surface and find alternative ways of doing things. If necessary, it may be remedial - correcting knowledge or skills or building confidence in the role of team leader.
- Feedback needs to be empathic in order that self-esteem and confidence is not damaged. Learning is now viewed as a spiral curriculum of revisiting and extending knowledge and skills, scaffolding and reinforcing, and with encouragement slowly or swiftly improving progress.

Adult learners want learning to be:

- personally significant- where am I now?
- personally relevant – where do I want to be?
- personally achievable – how can I get there?

All of this has to be achieved in a short space of time on courses.

- **Active listening**

Active learning is about hearing what the other person is communicating, both verbally and non-verbally and responding to what has been heard. The teacher must be enthusiastic and focused as active listening means being aware of one's own emotions, body language and language content as well as those of the candidate. Active listening is non-judgmental and allows the student's view to be heard and understood and it therefore depends a great deal on the attitude of the mentor/facilitator.

Thoughts, feelings and irritations concerning candidates can interfere with our ability to listen, show empathy and give good direction to candidates. The learner's feelings, opinions and person should be valued with respect for their fears and hesitancy and this will increase the confidence and trust of both the individual and team members to share problems.

- **Creating the mind set for inquiry**

Rogers says that by posing exploratory questions within a responsive, empathic climate one is helping students develop self-directed learning, which helps to foster continuity of learning.

Facilitators want learners to participate fully and freely in the learning conversation so that their knowledge and perspective can be explored and modified to achieve learning goals. Adult learners will then reconstruct their learning needs and find new strategies to achieve those goals ii. Rogers also proposes adults will resist behaviour change if they feel threatened, reorganisation of thoughts and reframing occurs better when people are relaxed iv.

Feedback to a student is an opportunity to build or destroy confidence, it is a communication skill that can be both taught and learned. Beard¹ illustrated the use a framework to deliver feedback increased the number of comments delivered to students when learning a skill. Kahn described how when one starts learning a skill the performance tends to be rule based and as one develops expertise there is greater fluidity and intuition. Feedback may be as important as the simulation itself to help trigger learning, during simulation teaching one can promote reflection-in-action with discrete prompting but the feedback afterwards is reflection-on-action and can reinforce performance.

A great deal of evidence in how to develop communication skills with patients has been amassed to create the Calgary-Cambridge guide to medical consultations and much of this is relevant to the learning conversation, even though the different context may need different emphasis.

- **The steps**

The mnemonic MESSAGE may act as a framework to help instructors develop the skills of a learning conversation.

- 1. Make an opening remark**

We want candidates to start talking, to tell their story and identify their own difficulties by reflection on their action. It is well recognised from clinical consultations it is better to let the narrative phase flow without interruption, the candidate is less likely to bring up new issues if they are allowed to talk freely initially.

This can be encouraged by the use of certain phrases, for example:

“What are your thoughts?”

“That looked hard”

“You looked as though you were enjoying the simulation?”

Show empathy using verbal and non-verbal skills but try not to interrupt.

- 2. Explore – allow the candidate to explore key issues with their team as well as with the facilitator. This allows feedback to be candidate-centered. The candidate will have their own:**

- ideas of how their performance
- concerns about their performance
- expectations of what they wish to achieve

Work in high fidelity simulation has shown we want as far as possible for people to debrief themselves

- 3. Summarise the issues identified and reflect these back, two to three are enough.**

- “So you were doubtful whether to give a second dose of adrenaline at the point?”
- “You felt you lost control of your team then too? Am I right?”

This is checking you have the right impression, watch their body language for receptivity.

- 4. Share the impression these issues have made – share your understanding by reflecting the comments to the other team members. “Team, you have heard this, he/she felt she lost control of the team at that point, you were the team, did you have the same impression? If so, what happened, what could have been done instead? Did the team listen to the team leader? Did team followers offer ideas when the team leader was struggling?”**

- 5. Advocacy with Inquiry. Information has now been gathered and the facilitator and team now have an understanding or impression of events. The term ‘advocacy’ means to ‘speak for’ someone, so that ‘advocacy with inquiry’ is the reflection of an impression gained through questioning.**

An example of how Advocacy be expressed is illustrated:

"My impression is, you were uncertain about whether or not to give the 2nd dose of adrenaline and then both you and the team feel you lost your confidence. Is that right?" By making the statement as an offering in this way the candidate now has an opportunity to affirm or refute and correct what has been said.

6. **"Gems". Sometimes during a teaching session one hears a statement suggesting something has not been clearly understood, but the time was not appropriate to interrupt. These 'gems' of information need to be remembered by the facilitator and brought out in the feedback; if one person in a team did not understand something probably somebody else did not either.**
7. **Emphasise the key points. These often concern areas of knowledge of the algorithms or the need for the team to work harder acting as team 'followers' and build team leadership confidence.**

With experience this schema will not be necessary, dialogue will develop and flow naturally. Careful reflection and delivery of the learning conversation is important or candidates may find the experience difficult. The message is to foster an open trusting relationship with students so that genuine advocacy with inquiry can occur.



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Contact details

European Resuscitation Council vzw
Emile Vanderveldelaan 35 - 2845 Niel - Belgium
info@erc.edu - www.erc.edu