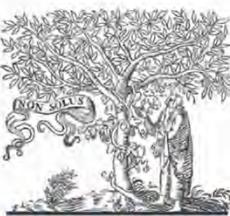


# Barn-HLR

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

**Resuscitation**

journal homepage: [www.elsevier.com/locate/resuscitation](http://www.elsevier.com/locate/resuscitation)

  
**ELSEVIER**



**European Resuscitation Council Guidelines 2021:  
Paediatric Life Support**

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Abel Martinez-Mejias<sup>g</sup>, Dominique Biarent<sup>h</sup>, Robert Bingham<sup>i</sup>, Olivier Brissaud<sup>j</sup>,  
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# Tre utbildningsprogram

- Hjärt-lungräddning till barn (**Barn-HLR**)
- Hjärt-lungräddning barn för sjukvårdspersonal (**S-HLR**)
- Avancerad HLR barn för sjukvårdspersonal (**A-HLR**)

## 5 TOP MESSAGES

\*0-18y, except newborns 'at birth'

- 1.** Use ABCDE as common language  
– Work as a team – Be competent.
- 2.** Titrate oxygen therapy to SpO<sub>2</sub> 94-98%  
- only if impossible to measure, start high flow O<sub>2</sub>,  
based on signs of circulatory/respiratory failure.
- 3.** In 'shock', give 1 or more fluid bolus(es) of  
10ml/kg of (preferably balanced) crystalloids  
(or blood products). Reassess after each bolus.  
Start vasoactive drugs early.
- 4.** For basic life support, use the specific PBLS  
algorithm (ABC - 15:2) if you are trained to do so.  
Both improving the quality of CPR and limiting the  
hands-off time are considered crucial.  
Consider provider safety.
- 5.** For advanced life support, use the specific PALS  
algorithm. Actively search for and treat reversible  
causes. Use 2-person BMV as the first line ventilatory  
support. Only if intubated, provide asynchronous  
ventilation at an age-dependent rate (10-25'/').

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ventilation at an age-dependent rate (10-25'/').

## KEY RECOMMENDATIONS



For PLS of all children (0-18y): use ABCDE as common language – work as a team – be competent.

## 5 TOP MESSAGES

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– Work as a team – Be competent.

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ventilation at an age-dependent rate (10-25'/').

## KEY RECOMMENDATIONS



**Titrate Oxygen R/ to Sp<sub>0</sub><sub>2</sub> 94-98% - only if impossible to measure, start high flow oxygen based on signs of circulatory/respiratory failure.**

## 5 TOP MESSAGES

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## KEY EVIDENCE



The specific algorithm for pbls continues to emphasize the importance of oxygenation and ventilation as part of CPR. We no longer speak of 'duty to respond', just of 'trained in PBLS'. Those trained should use the pbls algorithm. Specific targetgroups should use 2-person bmv for ventilations.

## 5 TOP MESSAGES

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treat reversible causes. Use 2-person BMV  
as the first line ventilatory support. Only if  
intubated, consider asynchronous ventilation  
at an age-dependent rate (10-25'/').

# Luftvägsstopp

1

## Andas, hostar eller talar



Uppmana att hosta, kontrollera andning

2

## Vid medvetande, kan inte andas, hosta eller tala

BÅRN UNDER 1 ÅR

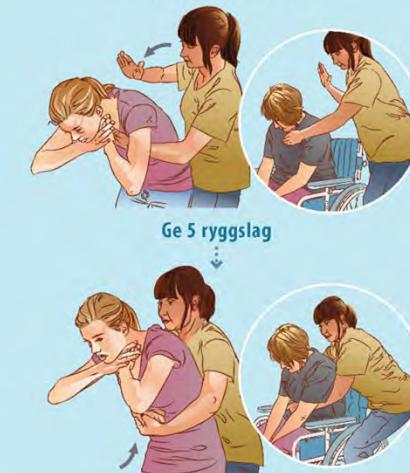


Ge 5 ryggslag

Ge 5 bröstdräkt

Utför ryggslag och bröstdräkt växlevis så länge barnet är vid medvetande eller tills barnet andas normalt.  
Titta i munnen vid misstanke om att föremålet kommit upp.

BÅRN ÖVER 1 ÅR / VUXNA



Ge 5 ryggslag

Ge 5 buktryck

Utför ryggslag och buktryck växlevis så länge personen är vid medvetande eller tills personen andas normalt.

3

## Medvetlös, ingen andning

Larma 112, starta HLR

BÅRN

Ge 5 inblåsningar och starta HLR med omväxlande 15 bröstkompresioner och 2 inblåsningar.

Titta i munnen vid misstanke om att föremålet kommit upp.



Hjälp är på väg  
Jag hjälper dig  
med HLR

Behåll kontakten med larmoperatören.  
Fortsätt HLR tills personen andas normalt eller tills ambulanspersonal tar över.

VUXNA

Starta HLR med omväxlande 30 bröstkompresioner och 2 inblåsningar.  
Titta i munnen vid misstanke om att föremålet kommit upp.

# Hjärt-lungräddning barn

BARN 0-1 ÅR

BARN 1-18 ÅR

1  
Medvetslös?



2  
Skapa öppen luftväg  
Andas normalt?



3  
Ingen eller onormal andning  
Ge 5 inblåsningar  
Blås tills bröstkorgen höjs



4  
Larma 112  
Aktivera telefonens högtalarfunktion



Behåll kontakten med  
larmoperatören tills  
ambulanspersonal  
tar över.



Kompressionsdjup 1/3 av bröstkorgens höjd, 4-6 cm djup beroende på ålder. Takt 100-120/min.

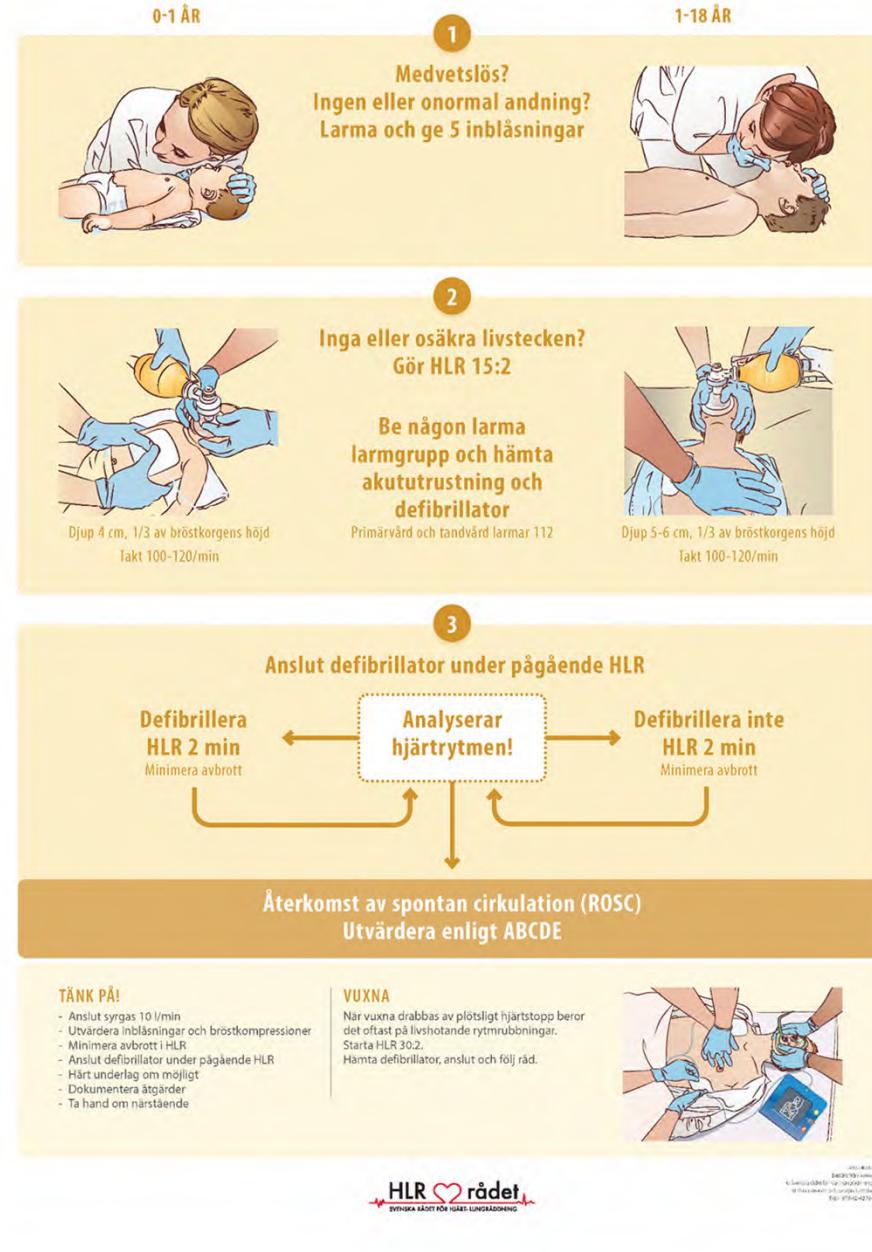
Finns hjärtstartare, starta och följ råden

Fortsätt HLR 15:2 tills barnet vaknar eller ambulanspersonal tar över.

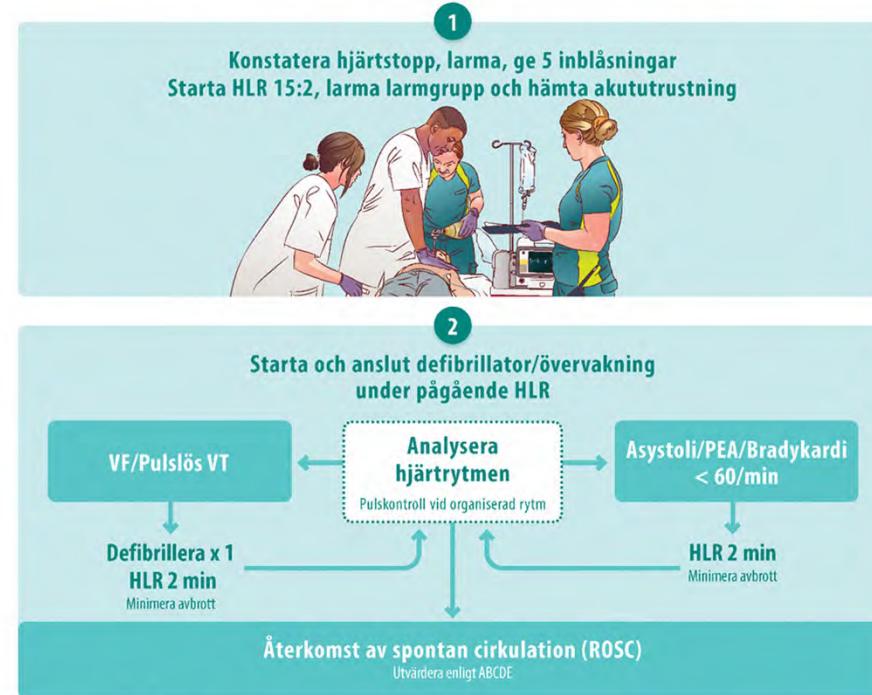
VUXNA Om barnet ser vuxen ut kan teknik för vuxen-HLR användas. När vuxna drabbas av hjärtstopp beror det ofta på livshotande rytmrubningar i hjärtat. Om medvetslös och ingen eller onormal andning, larma 112 och starta HLR 30:2. Kompressionsdjup 5-6 cm, takt 100-120/min. Finns hjärtstartare, starta och följ råden. Fortsätt HLR.

För att hitta närmaste hjärtstartare se  
[hjartstartareregistret.se](http://hjartstartareregistret.se)

# Hjärt-lungräddning barn för sjukvårdspersonal



# Avancerad hjärt-lungräddning barn



- UNDER PÅGÅENDE HLR
- Byt av varandra efter 2 min under analysfas
  - Teamledaren prioriterar barnets andning och utvärderar kvaliteten på HLR
  - Utvärdera 4H och 4T
  - Ta hand om närliggande

- LÄKEMEDEL UNDER PÅGÅENDE HLR
- Vid asystoli/bradykardi/PEA
- Adrenalin 0,01 mg/kg omedelbart.
  - Upprepa var fjärde minut.
- Vid VF/pulslös VT
- Adrenalin 0,01 mg/kg efter tredje defibrilleringen.
  - Upprepa var fjärde minut.

- KORRIGERA REVERSIBLA ORSAKER
- hypoxi
  - tamponad
  - hypo/hypertermi
  - tryckpneumothorax
  - hypovolēmi
  - toxiska tillstånd
  - hypoglykemi
  - tromboembolier
  - hyper/hypokalemia
  - hyper/hypomagnesemia
  - hyper/hypomagnesemia

## LÄKEMEDEL (IV/IO) VID HJÄRTSTOPP HOS BARN Ges efter läkarordination

Ålder Vikt, ca	0		3 mån		1 år		5 år		9 år		12 år		14 år		16 år		Vuxendos	
	3 kg	5 kg	10 kg	20 kg	30 kg	40 kg	50 kg	60 kg	70 kg	80 kg	90 kg	100 kg	110 kg	120 kg	130 kg	140 kg	ml	
Adrenalin (0,1 mg/ml) 0,01 mg/kg, 0,1 ml/kg	0,3	0,5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	ml	
Amiodaron (15 mg/ml)* 5 mg/kg, 0,33 ml/kg	1	1,7	3	7	10	13	17	20	23	26	29	32	35	38	41	44	ml	
Glukos 100 mg/ml, 3 ml/kg	9	15	30	60	90	120	150	180	210	240	270	300	330	360	390	420	ml	
Ringer-Acetat 10 ml/kg	30	50	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	ml	
Defibrillering 4 J/kg	12	20	40	80	120	150-200	150-200	150-200	150-200	150-200	150-200	150-200	150-200	150-200	150-200	150-200	J	
Endotrakealtub inv. diameter	3,0	3,5	4,0	5,0	6,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0	mm	
Ventilationsfrekvens efter intubation	25	25	20	20	15	10	10	10	10	10	10	10	10	10	10	10	/min	

\*Amiodaron 50 mg/ml, 6 ml spädes med 14 ml Glukos 50 mg/ml = 15 mg/ml

# Barn-HLR 2021

- 0-18 år, ser vuxen ut=vuxen-HLR kan användas
- Betoning på stödet från larmoperatören
- **15:2** - betonar ytterligare vikten av **prioriterad ventilation**)
- 5 inblåsn och sedan larma via mobil (högtalarfunktion)
- Ingen telefon: 1 min HLR och sedan hämta hjälp
- **Hjärtstartare om 2 livräddare**

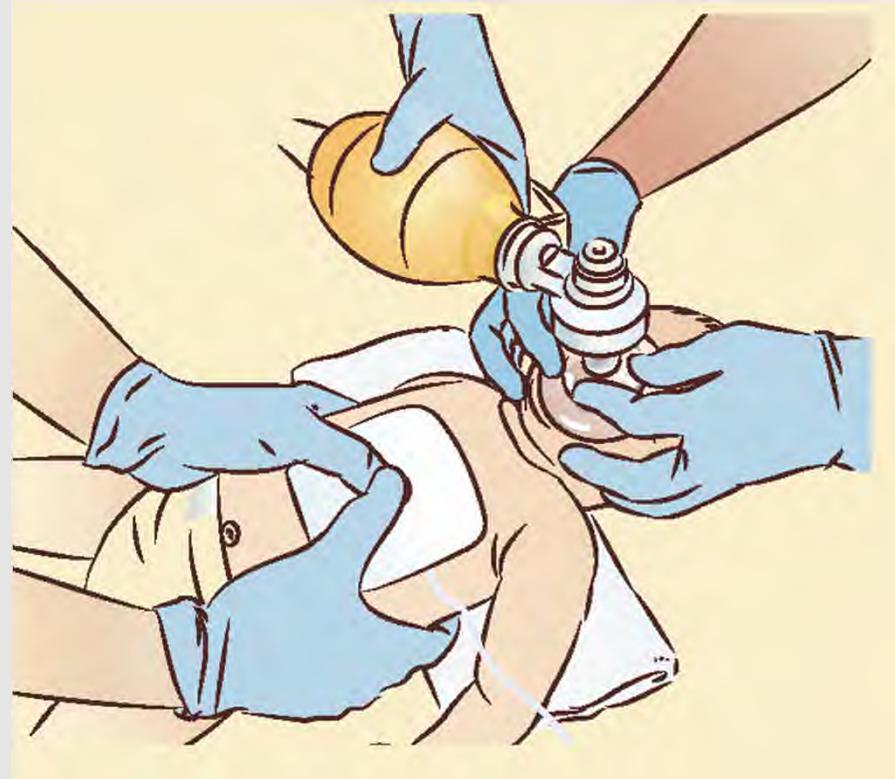
# S-HLR 2021

- Ökat focus på att förebygga hjärtstopp
- ABCDE-principen
- Om mätbar saturation, så titreras syrgastillförseln till sat >94%
- Ventilation med mask och blåsa hanterat av 2 personer
- Omslutande 2-handskompressioner < 1 år (2-fingerteknik  
fortfarande acceptabelt som alternativ om ensam livräddare)

# A-HLR 2021

- Ökat focus på att förebygga hjärtstopp
  - ABCDE-principen
  - Om mätbar saturation, så titreras syrgastillförseln till sat >94%
  - Ventilation med mask och blåsa hanterat av 2 personer
  - Omslutande 2-handskompressioner
- 
- Hypovolemi behandlas med vätskebolus(ar): **10 ml/kg**
  - Ökat fokus på teamarbete och teamträning

# Tack!



# Vem är livräddaren?

- **Ingen HLR-utbildning:** HLR med stöd av sos-operatören (T-HLR)
- **Utbildad i vuxen-HLR:** 5 inblåsningar, sedan HLR enligt vuxen-sekvens
- **Utbildad i barn-HLR:** 5 inblåsningar, 15:2
- **Inom vården:** S-HLR och A-HLR när kompetensen anländer

## Medvetslös person med luftvägsstopp

Om hindret inte avlägsnas snabbt blir barnet medvetslöst inom någon minut.

- Ge 5 inblåsningar
- Larma 112
- Starta HLR med 15 bröstkompressioner och 2 inblåsningar omväxlande tills barnet andas normalt eller att ambulanspersonal tar över.
- Titta i munnen vid misstanke om att föremålet kommit upp.

HLR-rådet rekommenderar att du praktiskt övar handgreppen under en instruktörsledd HLR-utbildning.



## BLSTM WHO COMES TO THE RESCUE

- **PBLS TRAINED**
  - Considering provider safety  
(cfr. COVID-19 specific guidelines)
- **BLS TRAINED:**
  - Do as learned
  - Ideally + 5 initial rescue breaths
- **UNTRAINED: DISPATCHER ASSISTED**
  - Same as PBLS but longer duty cycle (30:2)
  - AED only if high likelihood of primary shockable



# Pediatric Life Support: 2020 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations (CoSTR)

Originally published 21 Oct 2020 <https://doi.org/10.1161/CIR.0000000000000894> Circulation. 2020;142:S140–S184

## One-Hand Versus 2-Hand Compressions for Children (PLS 375: EvUp) Combined With Circumferential Compressions for Infants (PLS 416: EvUp)

An EvUp was performed to identify the available evidence about different techniques for chest compressions for infants and children. The previous review was published in 2010.<sup>9,10</sup> The EvUp did identify several studies published after 2010, and the task force agreed that these studies suggest the need to consider requesting a SysRev. Until a new SysRev is completed and analyzed by the PLS Task Force, the 2010 treatment recommendation remains in effect. To review the EvUp, see [Supplement Appendix C-2](#).

### Population, Intervention, Comparator, Outcome, Study Design, and Time Frame

- Population: Infants and children in cardiac arrest in any setting
- Intervention: 2 hands, 1 hand, circumferential, 2 fingers, a specific other method, a specific location
- Comparator: Another method or location
- Outcome: Any
- Study design: RCTs and nonrandomized studies (non-RCTs, interrupted time series, controlled before-and-after studies, cohort studies) eligible for inclusion
- Time frame: All years and languages were included if there was an English abstract. Literature was searched to December 2019.

### Treatment Recommendation

This treatment recommendation (below) is unchanged from 2010.<sup>9,10</sup>

Either a 1-hand or a 2-hand technique can be used for performing chest compressions on children.

There are insufficient data to make a recommendation for or against the need for a circumferential squeeze of the chest when performing the 2 thumb-encircling hands technique of external chest compression for infants.

