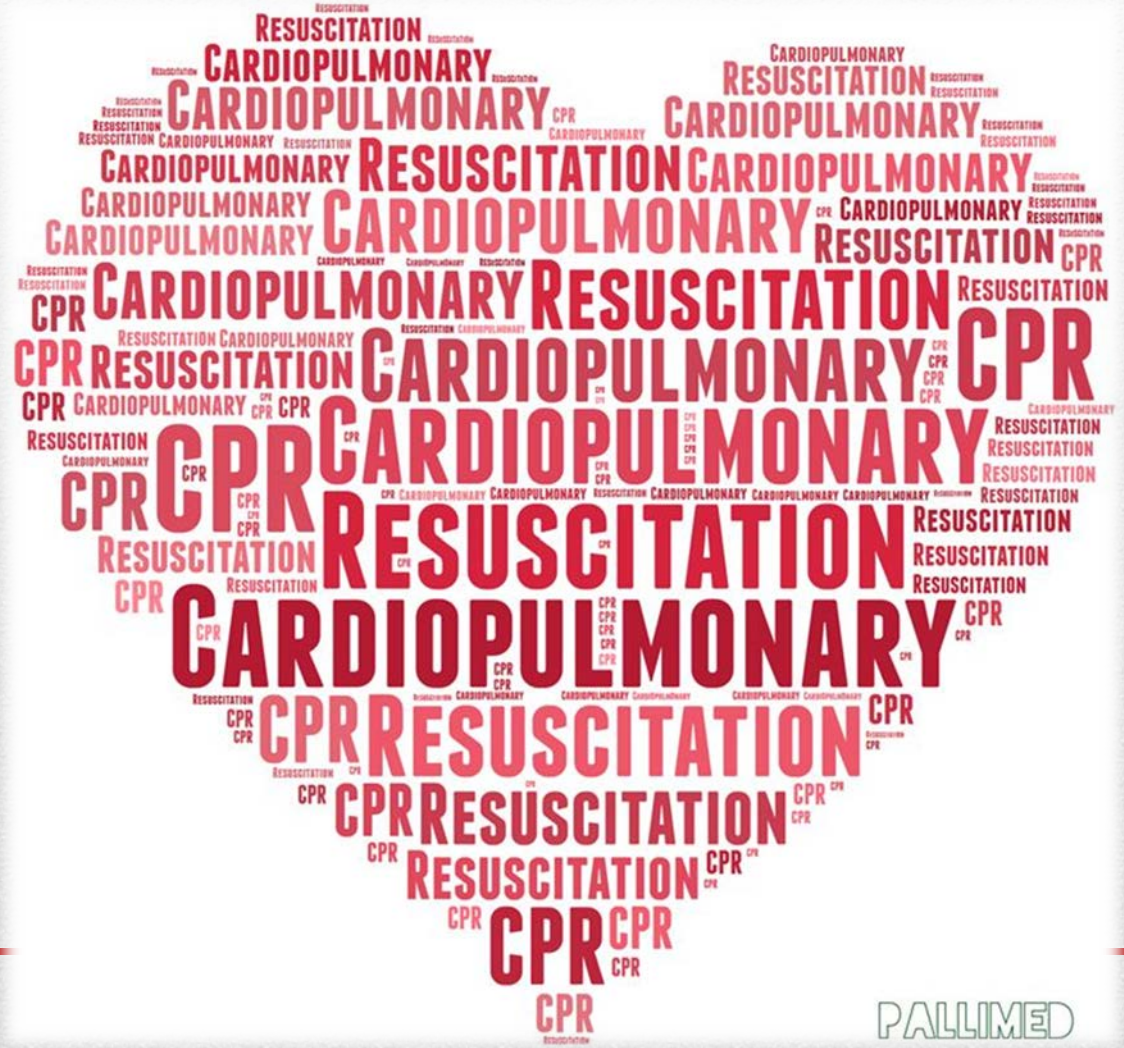
CPR

Cardio Pulmonary Resuscitation

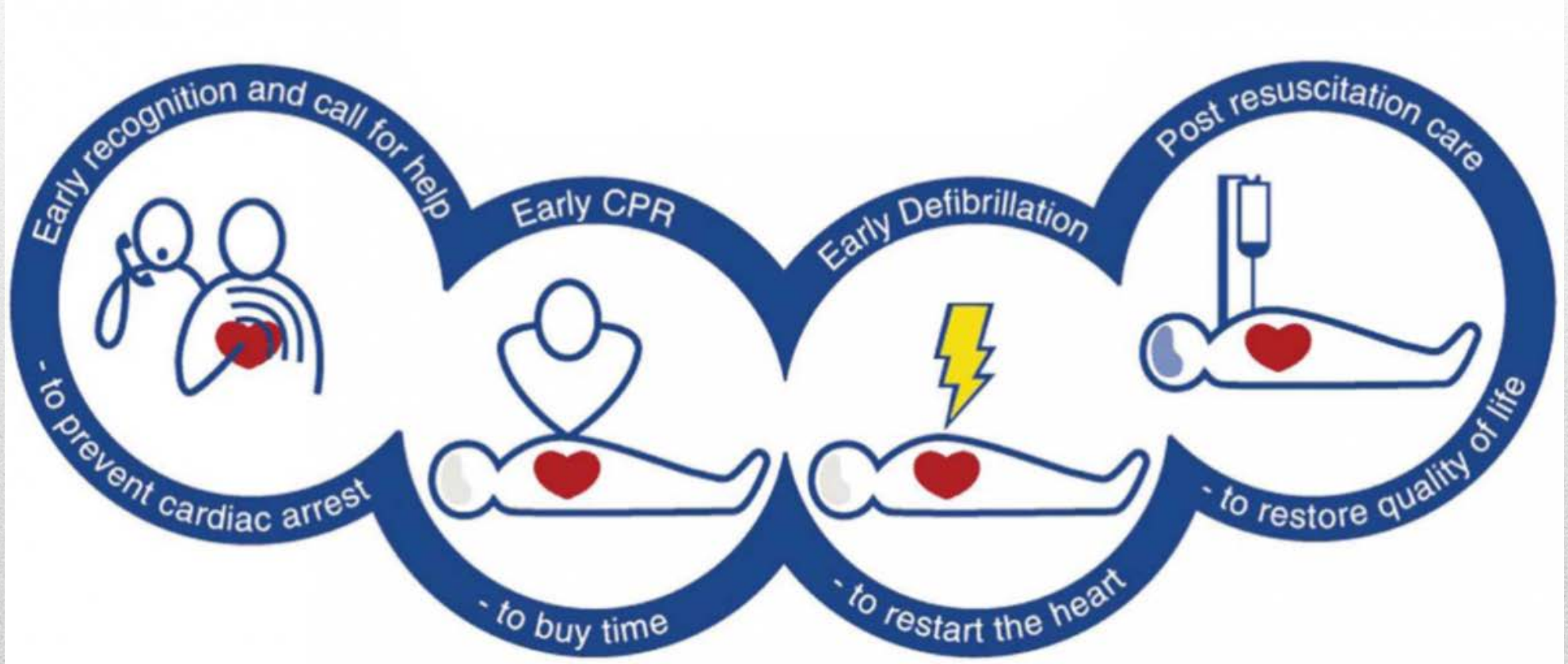


CPR

- = sequence of ***immediate actions to sustain flow of oxygenated blood***
- **unconsciousness and not breathing normally > start CPR !**

- ***vital functions:***
  - Consciousness
  - Breathing
  - Circulation

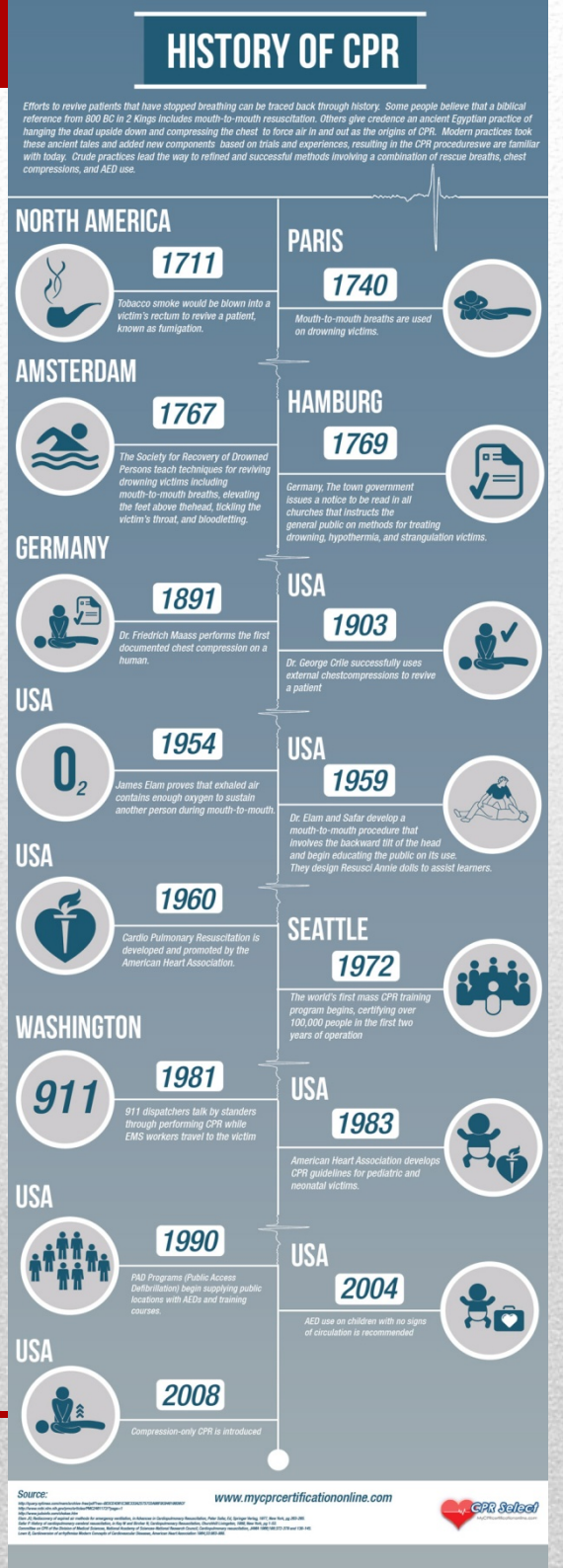
Chain of life (chain of survival)



History

- ***Peter Safar (1923 - 2003)***
  - experiments on volunteers, arteficial breathing
- ***Kouwenohoven et al***
  - chest compressions in dogs > palpation of pulse on carotid arteries
- ***1960***
  - Safar ***introduced first basic rules for CPR***

Short video here: https://www.youtube.com/watch?v=X0iyUi3KsVs



BLS vs. ALS

- **BLS = Basic Life Support**
  - no equipment available
  - Everybody can do it!
  - bystander x ***trained bystander***
  - ***AED***

- **ALS = Advanced Life Support**
  - medical professionals only
  - with equipments (drugs, monitoring, tracheal tube, ...)

When to start CPR ?

- patient ***unconscious and not breathing normally***
  - ***do NOT palpate radial pulsations!*** *(it takes time, it´s not so easy)*
- **GASPING IS NOT A NORMAL BREATHING**

CPR termination

- ***Patient defends himself against CPR***
- ***ROSC*** (Return Of Spontaneous Circulation)
- handover to ***medical team***
- ***exhaustion of rescuer***

Do not start CPR

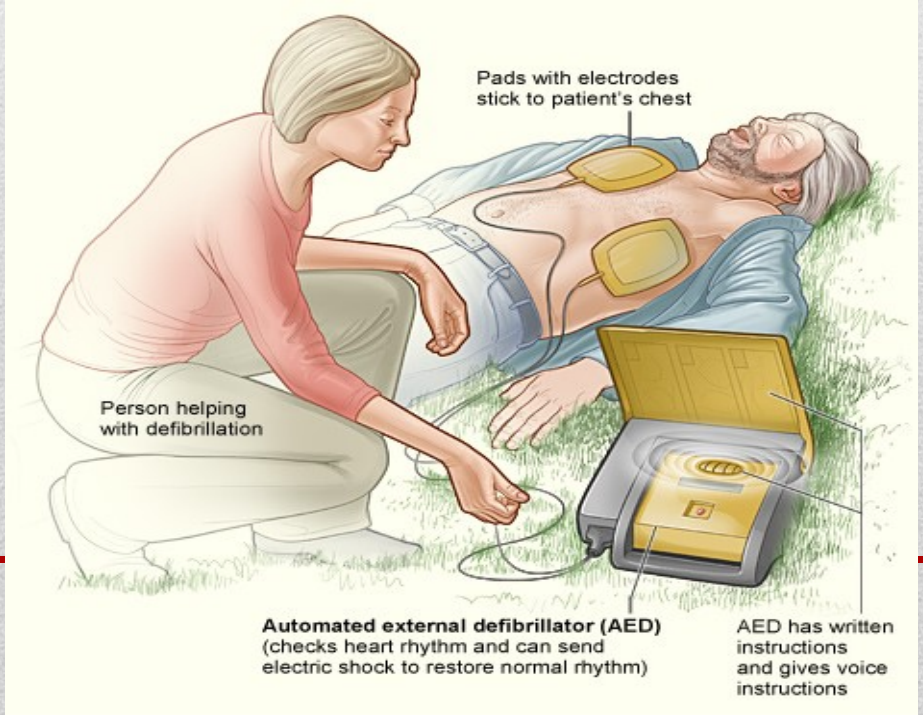
- ***danger*** for you and your colleagues
- ***Clearly obvious sings od death***
- ***catastrophic trauma (decapitation)***
- ***death penalty***

AED

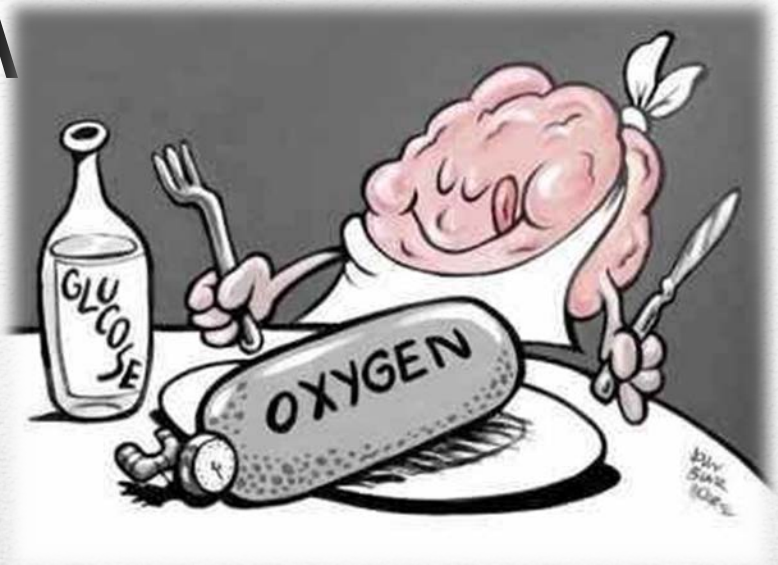
- = Automated External Defibrillator
- *In supermarkets, airports, railway stations, churchs …*

AED

- Automated External Defibrillator
- Patophysiology of sudden cardiac arrest in adults
  - **mostly cardiac etiology of cardiac arrest!**
- early available AED = **early first defibrillation**
- AED ***asses the rythm***
  - if it´s apropriate > ***deliver electric shock to the hearth***

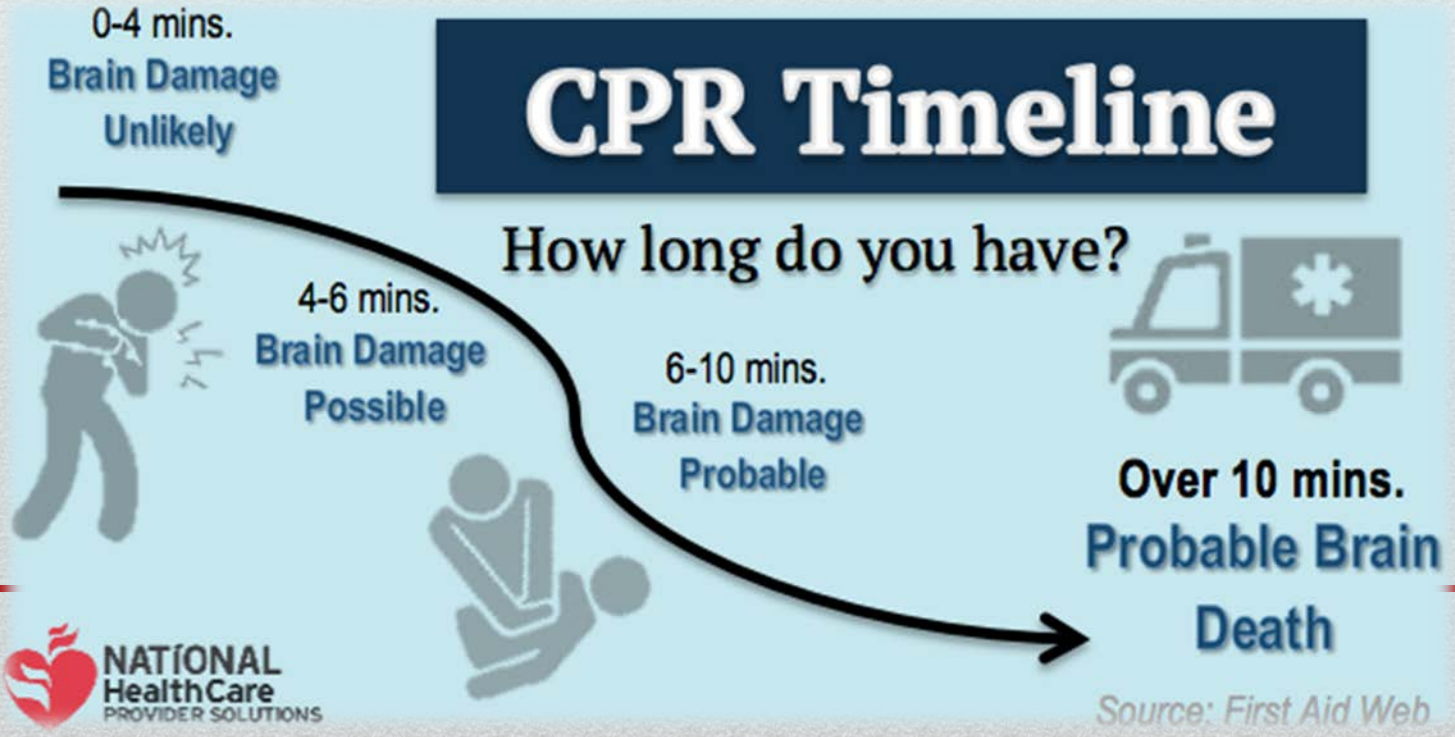


Patophysiology SCA



- **SCA** = ***Sudden Cardiac Arrest***

- after **15 seconds** SCA **unconsciousness**
- till **1 min gasping**
- **4 – 5 min** ***– brain cells death***



Causes SCA

- **Cardiac**
- **Non cardiac**

- ***SHOCKABLE***
- ***NON - SHOCKABLE***

Cardiac causes

- ***majority cases in adults***
- children < 15 %
- Most common **Ischaemic hearth disease**
  - CAD (Coronary Artery Disease - atherosclerosis)
- First rythm of SCA: 80-90% ***ventricular fibrillation*** or ***pulseless ventricular tachycardia***
- There is a reserve of oxygene in organism (for approx. 4-5min)
- **call first** aprroach

Non cardiac causes SCA

- majority ***in childhood***: 85 – 93 %
- adults < 20 %
- **choking, drowning, bleeding (massive blood lost)**
- all oxygen is consumpted , there is no reserve of oxygen in body
- **call fast** approach

Calling for help

- ***2 numbers in Czech Republic***
  - **155** = Emergency medical system
  - **112** = Integrated rescue system

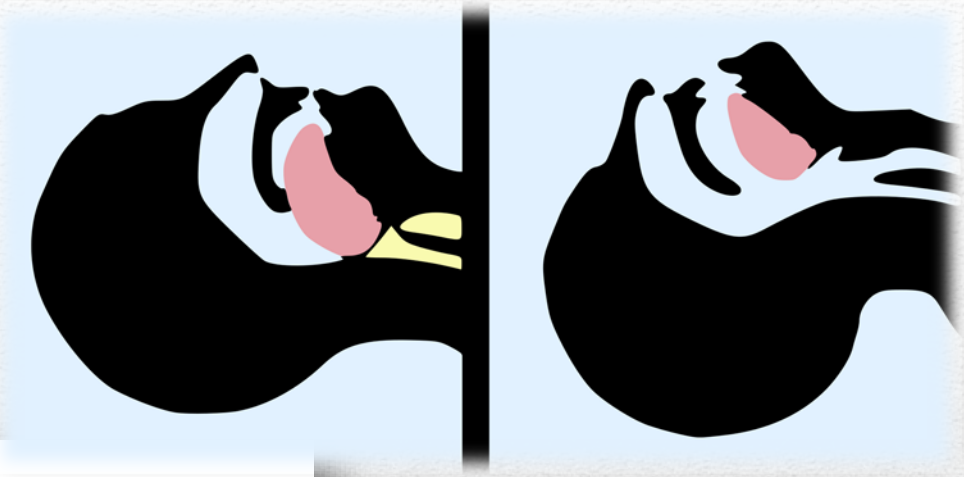
- ***How to call?***
  - introduce yourself
  - describe what happened
  - where, how to get there, orientation points, GPS
  - Who / how many people are involved, age, vital functions
  - their medical history (if you know it)
  - need for police / firemen help ?
  - wait for questions
  - **Telephone-assisted first aid/CPR**

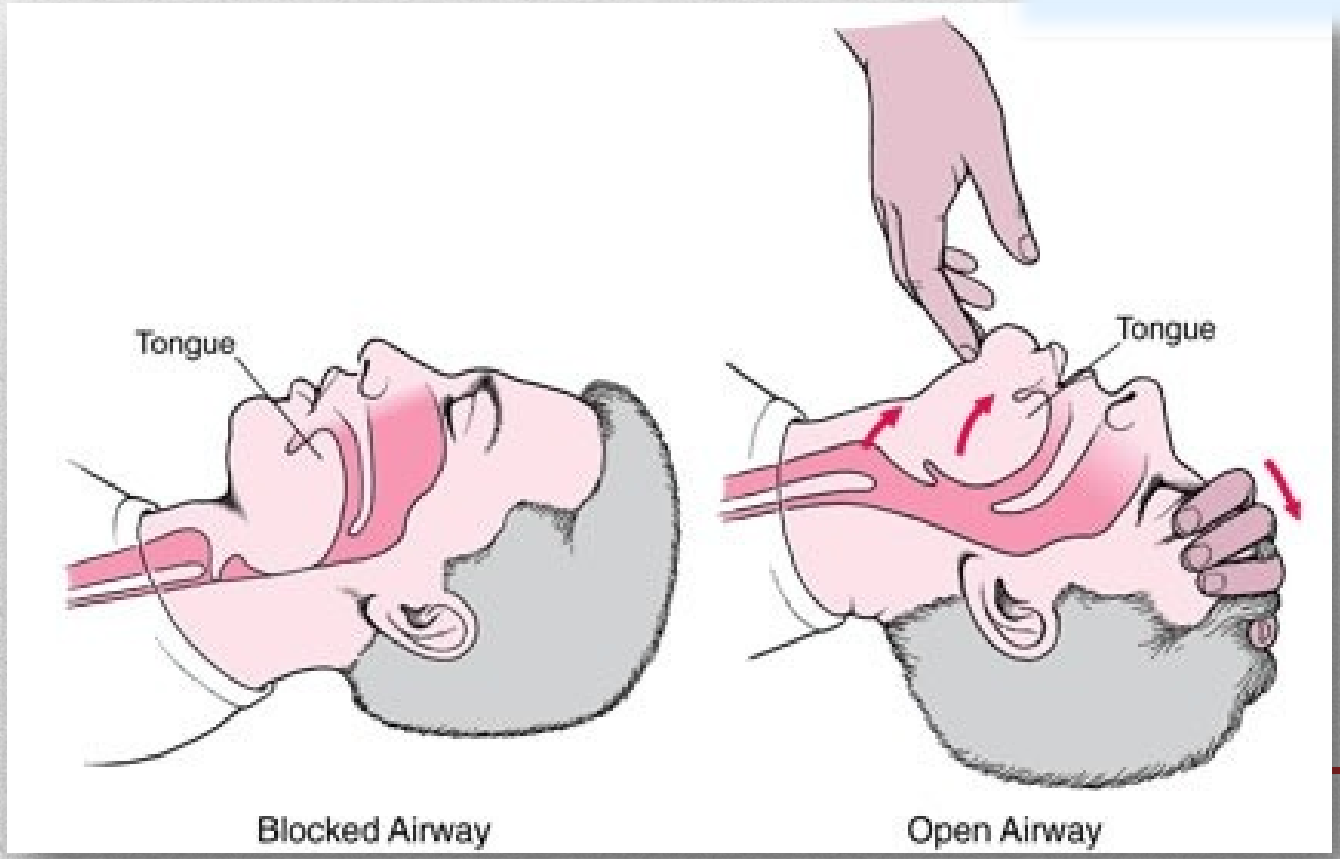
ABC approach

- **A** – Airway
- **B** – Breathing
- **C** – Circulation (+ AED)
- *… +D E F in Advanced life support*

Airways - DC

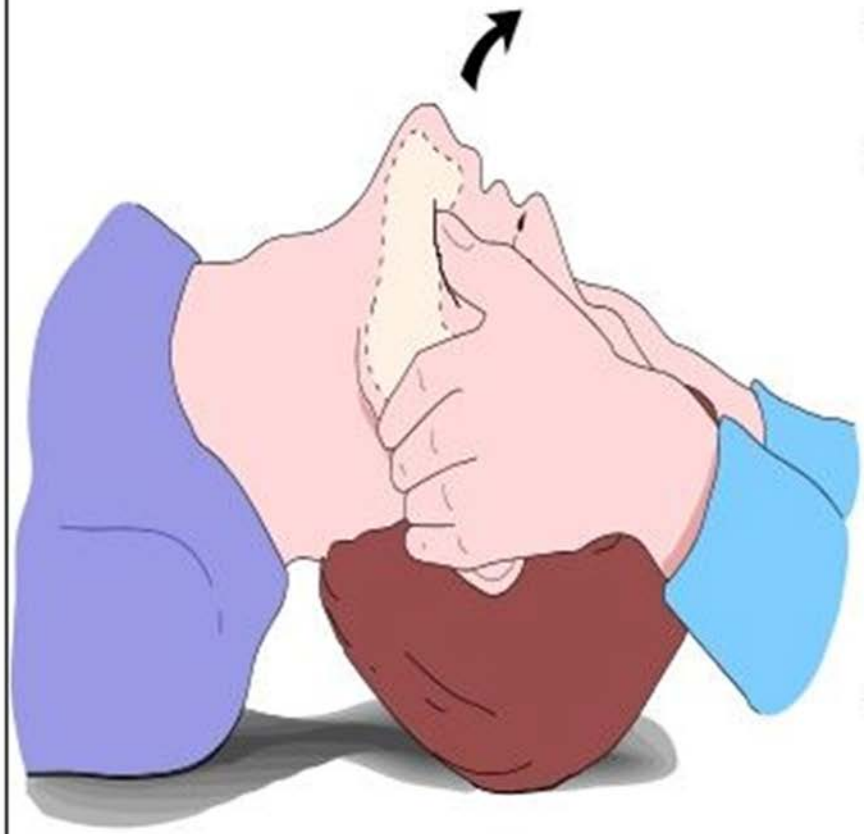
- ***head tilt, chin lift***
- ***jaw thrust***



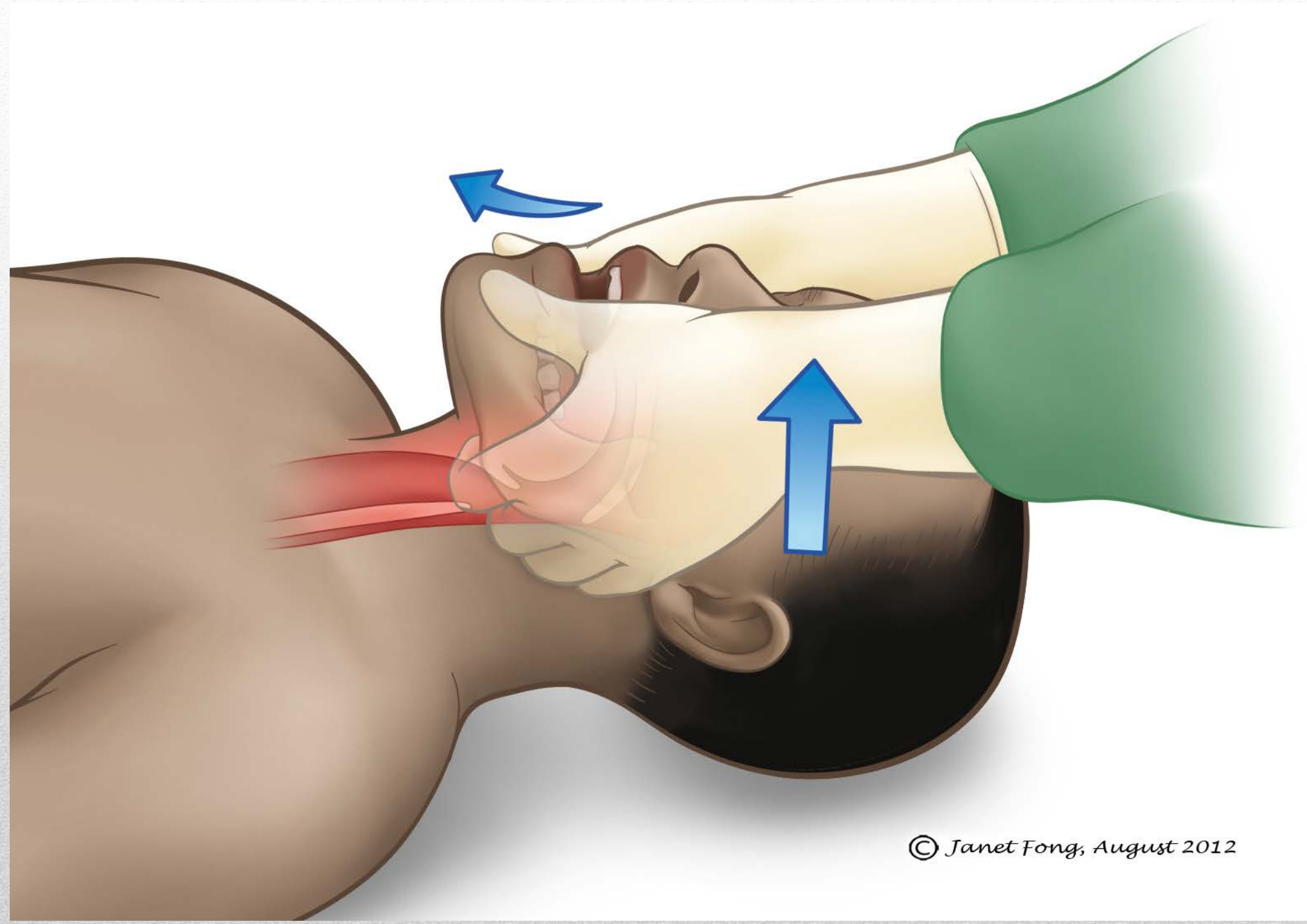


Airways – jaw thrust

Jaw Thrust



- An alternative to head tilt - chin lift
- Technique of choice where there is a strong suspicion of cervical spine injury (e.g. RTA, falls, drowning or diving accidents)
- Place fingers posterior to the mandibul of jaw and apply upward and forward pressure
- Hold mouth slightly open using thumbs to displace chin inferiorly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Breathing

- ***Tripple control of breathing***
  - Visual
  - Sense
  - Hearing

If ***uncouscious and not breathing normally*** (means not breathing or gasping) ***start CPR!***

CPR step by step

SAFETY

Make sure you, the victim and any bystanders are safe

RESPONSE

Check the victim for a response

Gently shake his shoulders and ask loudly: "Are you all right?"

If he responds leave him in the position in which you find him, provided there is no further danger; try to find out what is wrong with him and get help if needed; reassess him regularly

AIRWAY

Open the airway

Turn the victim onto his back if necessary

Place your hand on his forehead and gently tilt his head back; with your fingertips under the point of the victim's chin, lift the chin to open the airway

Image of Fig. 1.4

BREATHING

Look, listen and feel for normal breathing

In the first few minutes after cardiac arrest, a victim may be barely breathing, or taking infrequent, slow and noisy gasps.

Do not confuse this with normal breathing. Look, listen and feel for **no more** than 10 seconds to determine whether the victim is breathing normally.

If you have any doubt whether breathing is normal, act as if it is they are not breathing normally and prepare to start CPR

UNRESPONSIVE AND NOT BREATHING NORMALLY

Alert emergency services

Ask a helper to call the emergency services (112) if possible otherwise call them yourself

Stay with the victim when making the call if possible

Activate speaker function on phone to aid communication with dispatcher

CPR – BLS with AED

UNRESPONSIVE AND NOT BREATHING NORMALLY	Ask a helper to call the emergency services (112) if possible otherwise call them yourself Stay with the victim when making the call if possible
Alert emergency services	A[illegible] Image of Fig. 1.4 n on phone to aid communication with dispatcher
SEND FOR AED	Send someone to find and bring an AED if available. If you are on your own, do not leave the victim, start CPR
Send someone to get AED	

Fig. 1.4. Step by step sequence of actions for use by the BLS/AED trained provider to treat the adult cardiac arrest victim.

BLS – mechanic compressions

CIRCULATION

Start chest compressions

Kneel by the side of the victim

Place the heel of one hand in the centre of the victim's chest; (which is the lower half of the victim's breastbone (sternum))

Place the heel of your other hand on top of the first hand

Interlock the fingers of your hands and ensure that pressure is not applied over the victim's ribs

Keep your arms straight

Do not apply any pressure over the upper abdomen or the bottom end of the bony sternum (breastbone)

Position yourself vertically above the victim's chest and press down on the sternum at least 5 cm but not more than 6 cm.

Image of Fig. 1.4

ssion, release all the pressure on the chest without losing contact between your hands and the sternum

Repeat at a rate of 100-120 min^{-1}

Trained bystanders – rescue breaths

IF TRAINED AND ABLE

Combine chest compressions with rescue breaths

After 30 compressions open the airway again using head tilt and chin lift

Pinch the soft part of the nose closed, using the index finger and thumb of your hand on the forehead

Allow the mouth to open, but maintain chin lift

Take a normal breath and place your lips around his mouth, making sure that you have a good seal

Blow steadily into the mouth while watching for the chest to rise, taking about 1 second as in normal breathing; this is an effective rescue breath

Maintaining head tilt and chin lift, take your mouth away from the victim and watch for the chest to fall as air comes out

Take another normal breath and blow into the victim's mouth once more to achieve a total of two effective rescue breaths. Do not interrupt compressions by more than 10 seconds to deliver two breaths. Then return your hands without delay to the correct position on the sternum and give a further 30 chest compressions

Fig. 1.4. (Continued)

BLS after AED arrived

Continue with chest compressions and rescue breaths in a ratio of 30:2

IF UNTRAINED OR UNABLE TO DO RESCUE BREATHS

Continue compression only CPR

Give chest compressions only CPR (continuous compressions at a rate of 100-120 min^{-1})

WHEN AED ARRIVES

Switch on the AED and attach the electrode pads

As soon as the AED arrives:

Switch on the AED and attach the electrode pads on the victim's bare chest

If more than one rescuer is present, CPR should be continued while electrode pads are being attached to the chest

Follow the spoken/visual directions

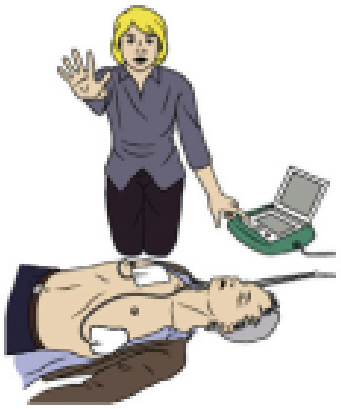
Ensure that nobody is touching the victim while the AED is analysing the rhythm

AED – schock indicated x nonindicated

If a shock is indicated,

deliver shock

Image of Fig. 1.4



Ensure that nobody is touching the victim

Push shock button as directed (fully automatic AEDs will deliver the shock automatically)

Immediately restart CPR 30:2

Continue as directed by the voice / visual prompts

If no shock is indicated,

continue CPR

Immediately resume CPR. Continue as directed by the voice/visual prompts

Fig. 1.4. *(Continued)*

Unresponsive and breathing normally

IF UNRESPONSIVE BUT BREATHING NORMALLY

If you are certain the victim is breathing normally but is still unresponsive, place in the recovery position (see First aid chapter).

It is rare for CPR alone to restart the heart. Unless you are certain the person has recovered continue CPR

Signs the victim has recovered

- waking up
- moving
- opens eyes
- normal breathing

Be prepared to restart CPR immediately if patient deteriorates

CPR children

- ***majority cause – asphyxia***
  - choking, drowning, inflammation,...
- **call fast** approach
- reversion of hypoxia
- ***age borders not clear***
- newborn x child x older child

CPR children

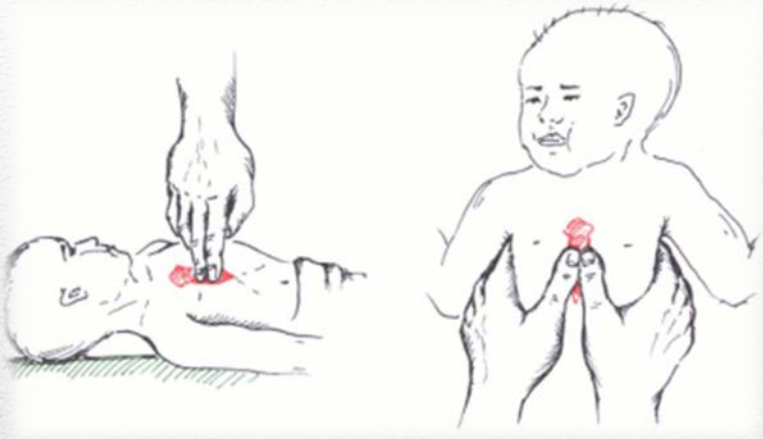
- Always ***start with 5 inicial breaths*** (airways opened)
- basic rule ***15 : 2***
- Depth of compressions: ***1/3 of thorax high***
- Rate of compressions***: 100 – 120/min***

- AED – ***children pads***

- **1 min CPR before calling EMS**

- **Newborns**
  - ***ratio compressions: breath = 3:1***

CPR children



EUROPEAN RESUSCITATION COUNCIL

Paediatric Basic Life Support

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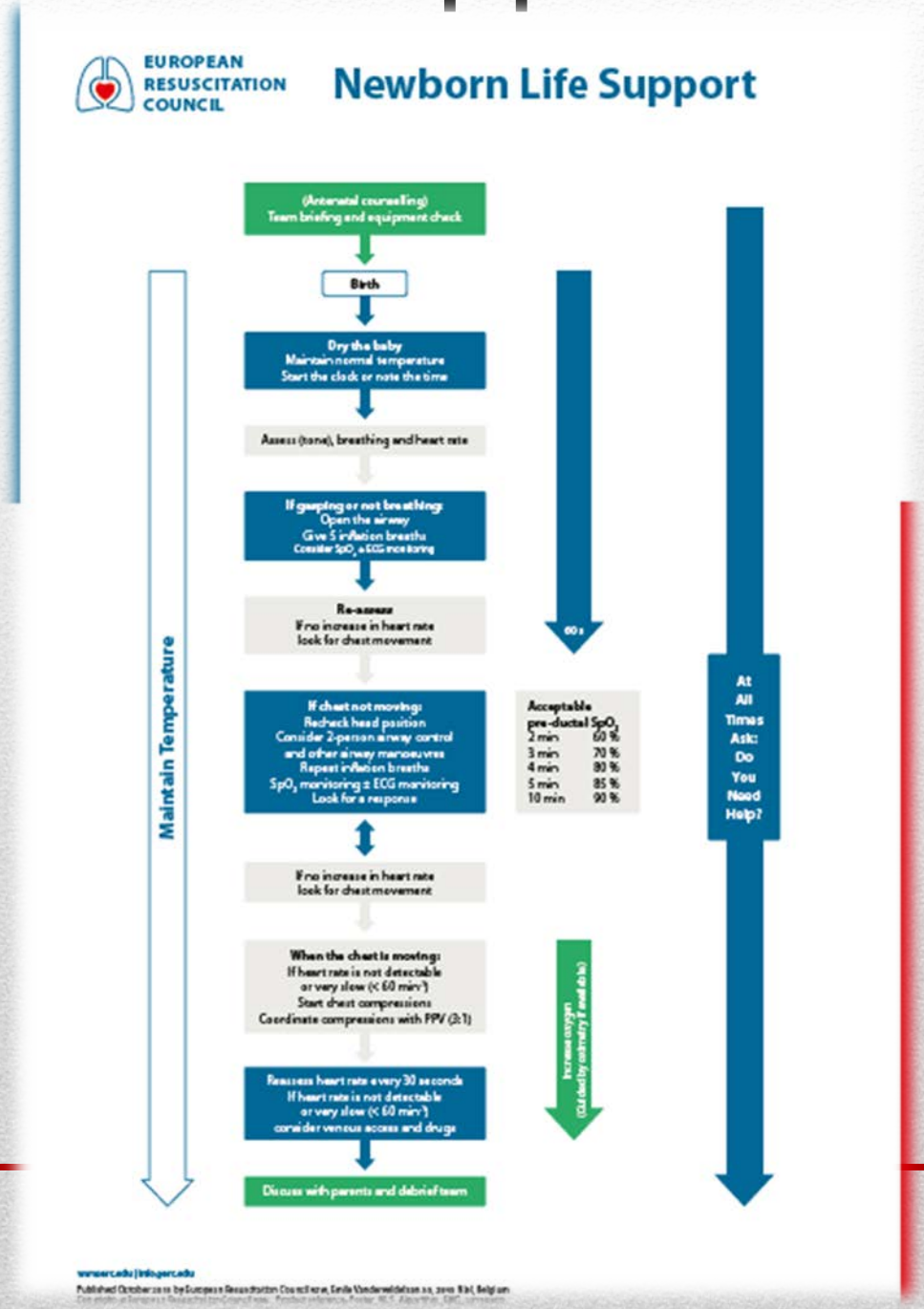
Newborn life support



CPR during specific situations

DROWNING

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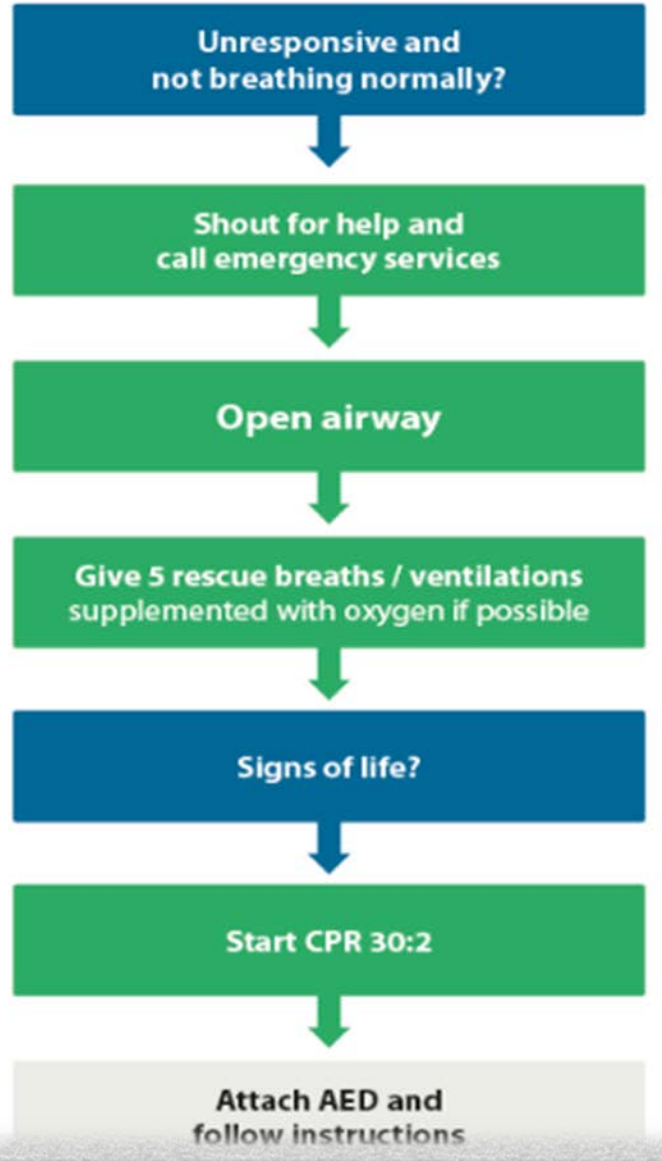
Drowning

- **Asfyxia** like cause of SCA
- ***Start with 5 inicial breaths!***
- Continue with CPR according BLS guidelines
- ***„ Nobody is dead till warm and dead “***




KEEP
CALM
AND DO CPR WITH
GOOD CHEST
COMPRESSION