

Causes and Prevention of Cardiac Arrest

Learning outcomes

- The importance of early recognition of the deteriorating patient
- The causes of cardiac arrest in adults
- Identify and treat patients at risk of cardiac arrest using the ABCDE approach

Chain of survival

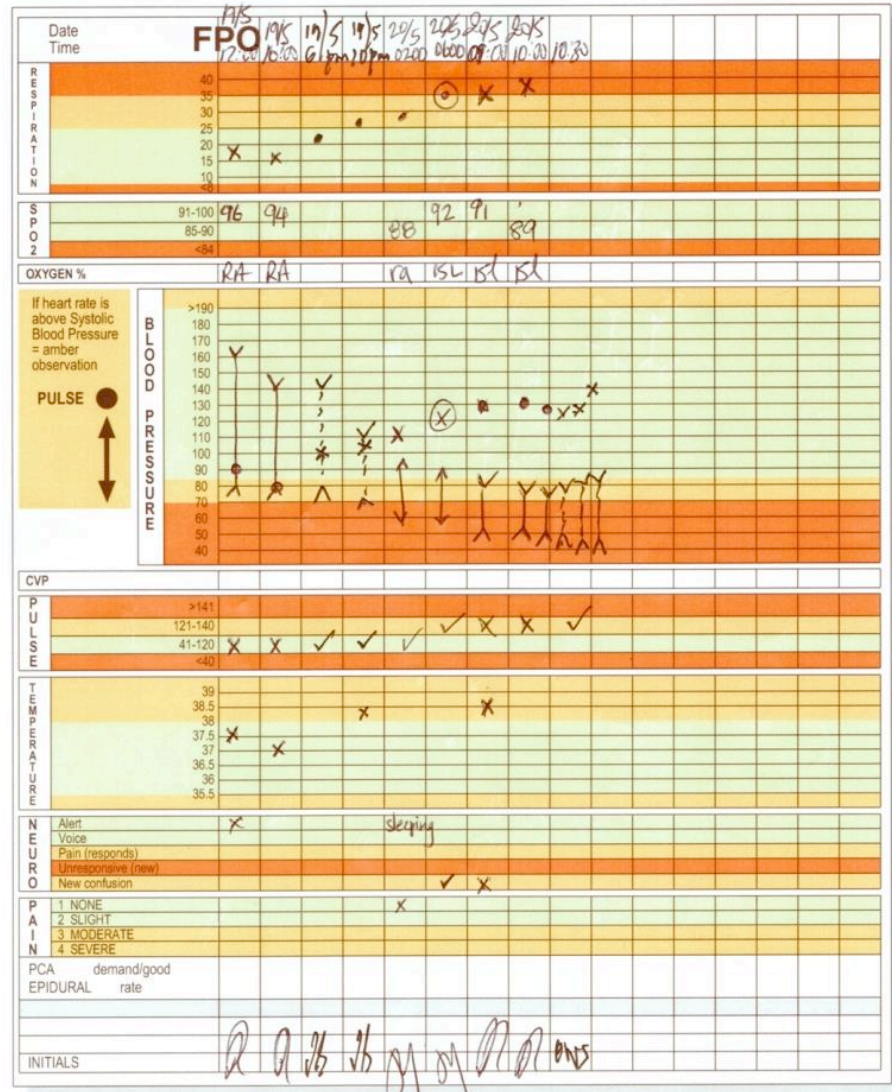


Early recognition prevents:

- Cardiac arrests and deaths
- Admissions to ICU
- Inappropriate resuscitation attempts

Early recognition of the deteriorating patient

- Most arrests are predictable
- Deterioration prior to 50 - 80% of cardiac arrests
- Hypoxia and hypotension are common antecedents
- Delays in referral to higher levels of care



Outcome after in-hospital cardiac arrest (UK)

	VF/VT	Non-VF/VT
Number of patients	570 (18%)	2,614 (82%)
ROSC > 20 min	385 (68%)	689 (26%)
Survival to hospital discharge	251 (44%)	179 (7%)

- Source: National Cardiac Arrest Audit (NCAA) 2010
- Based on 3,184 **adults** (aged ≥ 16 y) in 61 hospitals participating in NCAA (increasing numbers of hospitals during Oct 2009 to Oct 2010) with known presenting/first documented rhythm and complete data for ROSC and survival to hospital discharge. All these individuals received chest compressions and/or defibrillation from the resuscitation team in response to a 2222 call. Many in-hospital cardiac arrests do not fulfil these criteria and are not included here.
- For full definitions, see NCAA Dataset Specification



Supported by Resuscitation Council (UK) and ICNARC

Chart 1: The NEWS scoring system

Physiological parameter	Score						
	3	2	1	0	1	2	3
Respiration rate (per minute)	≤8		9–11	12–20		21–24	≥25
SpO ₂ Scale 1 (%)	≤91	92–93	94–95	≥96			
SpO ₂ Scale 2 (%)	≤83	84–85	86–87	88–92 ≥93 on air	93–94 on oxygen	95–96 on oxygen	≥97 on oxygen
Air or oxygen?		Oxygen		Air			
Systolic blood pressure (mmHg)	≤90	91–100	101–110	111–219			≥220
Pulse (per minute)	≤40		41–50	51–90	91–110	111–130	≥131
Consciousness				Alert			CVPU
Temperature (°C)	≤35.0		35.1–36.0	36.1–38.0	38.1–39.0	≥39.1	

Chart 2: NEWS thresholds and triggers

NEWS score	Clinical risk	Response
Aggregate score 0–4	Low	Ward-based response
Red score Score of 3 in any individual parameter	Low–medium	Urgent ward-based response*
Aggregate score 5–6	Medium	Key threshold for urgent response*
Aggregate score 7 or more	High	Urgent or emergency response**

* Response by a clinician or team with competence in the assessment and treatment of acutely ill patients and in recognising when the escalation of care to a critical care team is appropriate.

**The response team must also include staff with critical care skills, including airway management.

The ABCDE approach to the deteriorating patient

Airway

Breathing

Circulation

Disability

Exposure

ABCDE approach

Underlying principles:

- Complete initial assessment
- Treat life-threatening problems
- Reassessment
- Assess effects of treatment/interventions
- Call for help early

ABCDE approach

- Personal safety
- Patient responsiveness
- First impression
- Vital signs
 - Respiratory rate, SpO₂, pulse, BP, GCS, temperature

ABCDE approach

Airway

Causes of airway obstruction:

- CNS depression
- Blood
- Vomit
- Foreign body
- Trauma
- Infection
- Inflammation
- Laryngospasm
- Bronchospasm

ABCDE approach

Airway

Recognition of airway obstruction:

- Talking
- Difficulty breathing, distressed, choking
- Shortness of breath
- Noisy breathing
 - Stridor, wheeze, gurgling
- See-saw respiratory pattern, accessory muscles

ABCDE approach

Airway

Treatment of airway obstruction:

- Airway opening
 - Head tilt, chin lift, jaw thrust
- Simple adjuncts (simple devices: oral airway, nasal airway)
- Advanced techniques
 - e.g. LMA, tracheal tube
- Oxygen

ABCDE approach

Breathing

Causes of breathing problems:

- Decreased respiratory drive
 - CNS depression
- Decreased respiratory effort
 - Muscle weakness
 - Nerve damage
 - Restrictive chest defect
 - Pain from fractured ribs
- Lung disorders
 - Pneumothorax
 - Haemothorax
 - Infection
 - Acute exacerbation COPD
 - Asthma
 - Pulmonary embolus
 - ARDS

ABCDE approach

Breathing

Recognition of breathing problems:

- Look
 - Respiratory distress, accessory muscles, cyanosis, respiratory rate, chest deformity, conscious level
- Listen
 - Noisy breathing, breath sounds
- Feel
 - Expansion, percussion, tracheal position

ABCDE approach

Breathing

Treatment of breathing problems:

- Airway
- Oxygen
- Treat underlying cause
 - e.g. drain pneumothorax
- Support breathing if inadequate
 - e.g. ventilate with bag-mask

ABCDE approach

Circulation

Causes of circulation problems:

- Primary

- Acute coronary syndromes
- Arrhythmias
- Hypertensive heart disease
- Valve disease
- Drugs
- Hereditary cardiac diseases
- Electrolyte/acid base abnormalities

- Secondary

- Asphyxia
- Hypoxaemia
- Blood loss
- Hypothermia
- Septic shock

ABCDE approach

Circulation

Recognition of circulation problems:

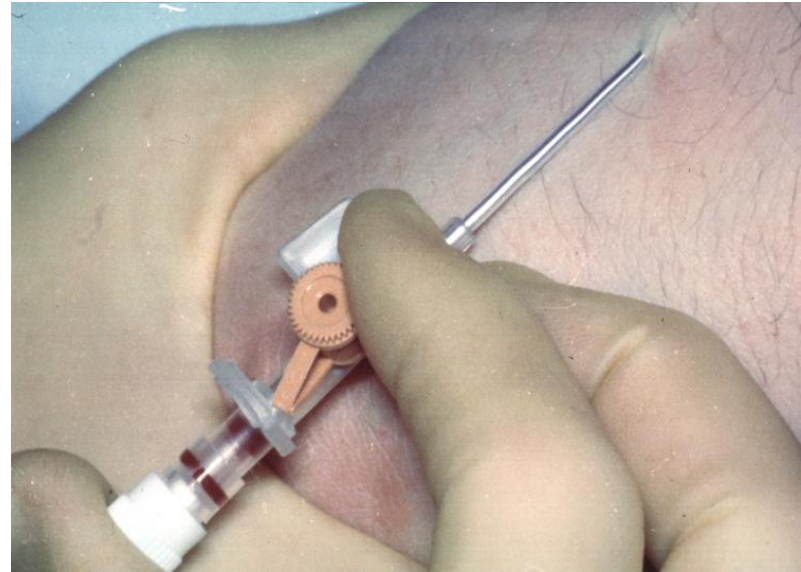
- Look at the patient
- Pulse - tachycardia, bradycardia
- Peripheral perfusion - capillary refill time
- Blood pressure
- Organ perfusion
 - Chest pain, mental state, urine output
- Bleeding, fluid losses

ABCDE approach

Circulation

Treatment of circulation problems:

- Airway, Breathing
- Oxygen
- IV/IO access, take bloods
- Treat cause
- Fluid challenge
- Haemodynamic monitoring
- Inotropes/vasopressors
- Aspirin/nitrates/oxygen (if appropriate) and morphine for acute coronary syndrome



ABCDE approach

Disability

Recognition

- AVPU or GCS
- Pupils

Treatment

- ABC
- Treat underlying cause
- Blood glucose
 - If $< 4 \text{ mmol l}^{-1}$ give glucose
- Consider lateral position
- Check drug chart

ABCDE approach

Exposure

- Remove clothes to enable examination
 - e.g. injuries, bleeding, rashes
- Avoid heat loss
- Maintain dignity

Any questions?

Summary

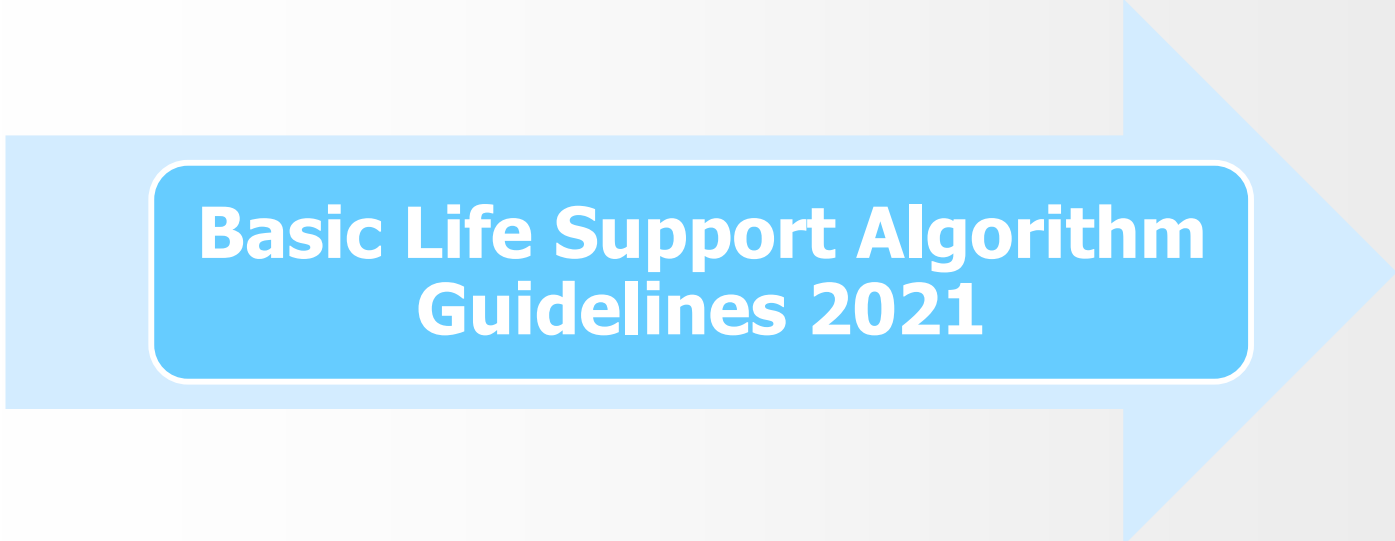
- Early recognition of the deteriorating patient may prevent cardiac arrest
- Most patients have warning symptoms and signs before cardiac arrest
- Airway, breathing or circulation problems can cause cardiac arrest
- ABCDE approach to recognise and treat patients at risk of cardiac arrest

Advanced Life Support Course

Slide set

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**Basic Life Support Algorithm
Guidelines 2021**

Cardiopulmonary Arrest.....Definition

Cessation of the spontaneous function of the cardiovascular and respiratory system

Cardiopulmonary resuscitation Definition

Artificial delivery of the oxygenated blood through the vascular beds of the vital organs to maintain the function of these vital organs

Our main job is to maintain adequate blood flow containing O₂ and nutrients to the cells of the vital organs to try to prevent permanent damage



OBJECTIVES



To know

Assessment, airway, breathing, circulation

How to perform cardiopulmonary resuscitation in adequate manner

How to turn the patient in a recovery position

The possible problems that may be associated with the BLS

Introduction

Initial assessment, Aw maintenance ,expired air ventilation, chest compression

No equipment is used

Aim is to keep adequate vent. Circulation until equipment can be obtained .

The first 3-4 golden min

O2 content ,available and reserve

Permanent damage

Chain of survival



Early recognition prevents:

- Cardiac arrests and deaths
- Admissions to ICU
- Inappropriate resuscitation attempts

BLS algorithm

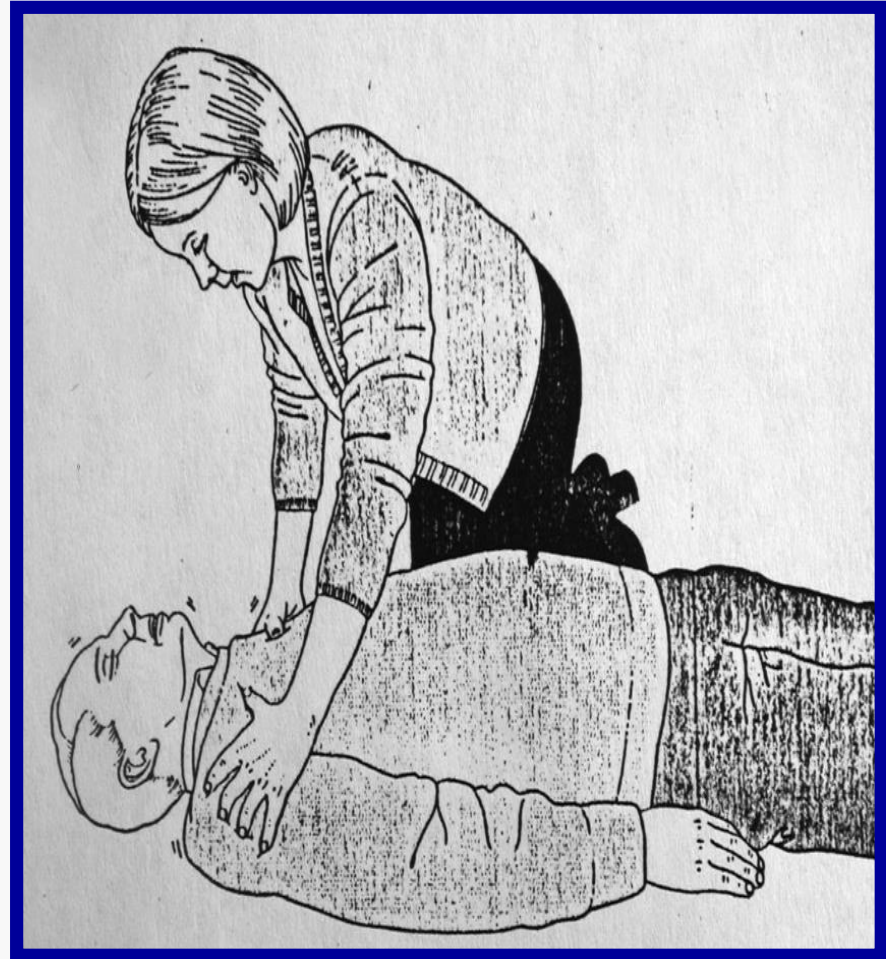
Safe to approach

Check response

If responsive

leave in the same position

check regularly



BLS algorithm

**If no
response**

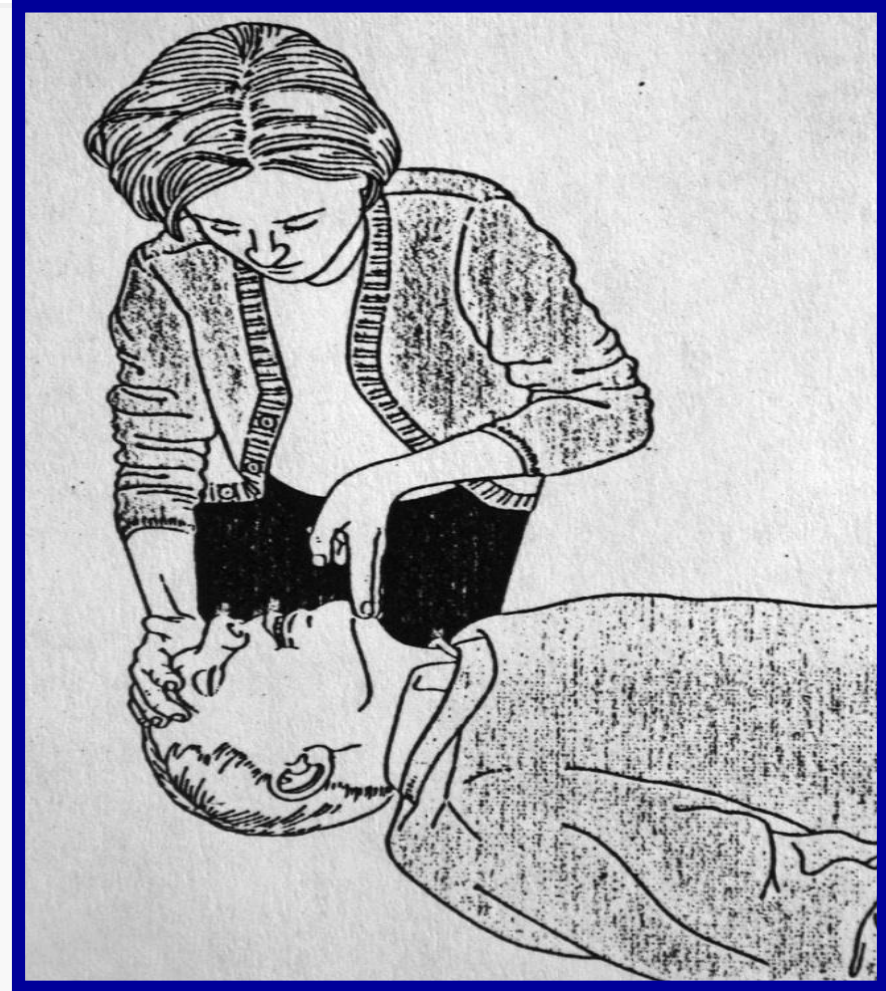
**Ask for
help**

**Open the
AW**

Head tilt

Chin lift

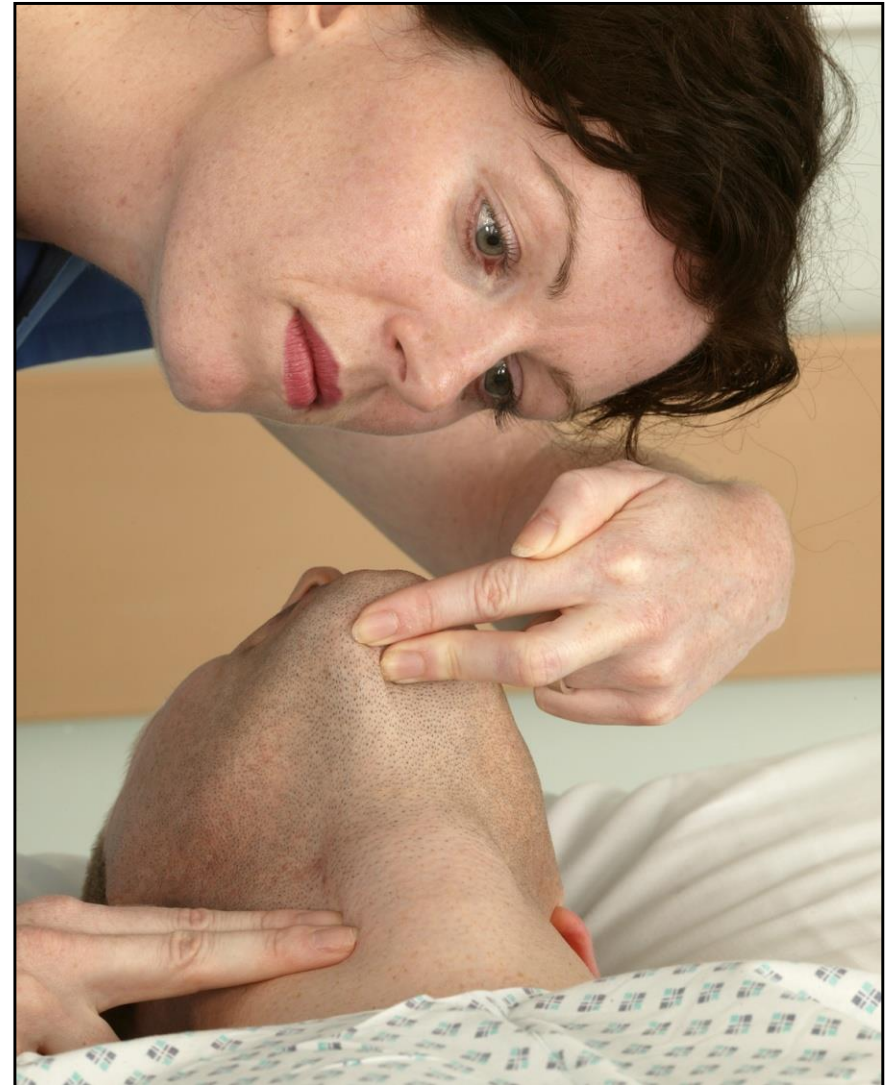
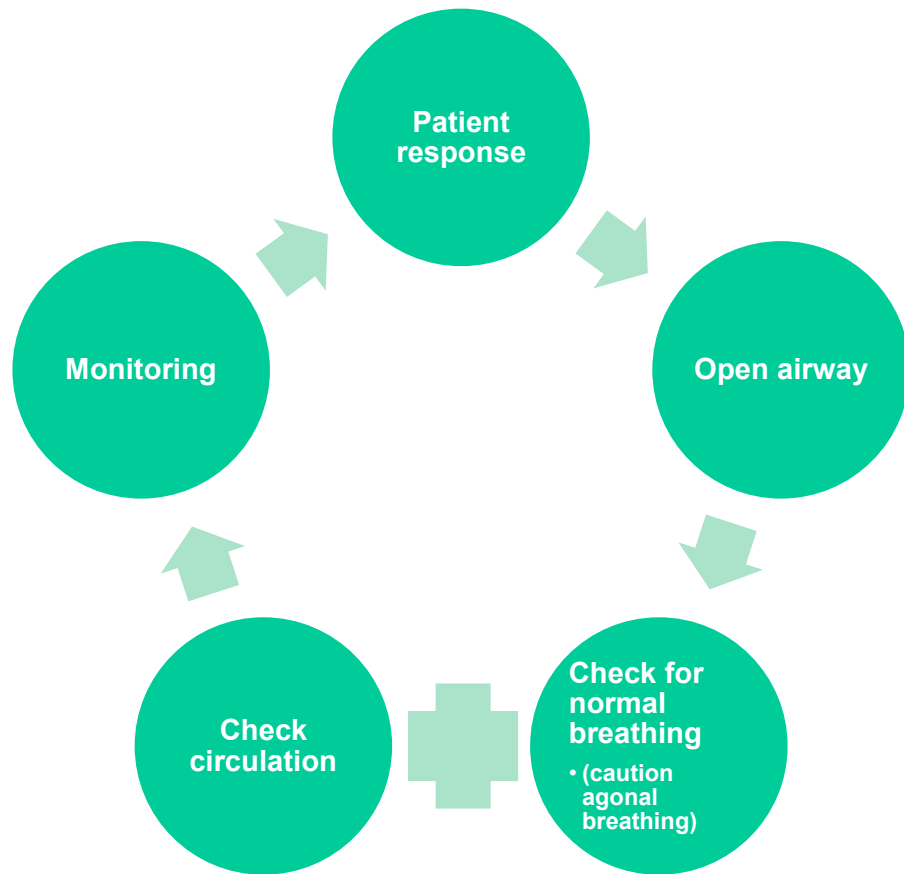
**Jaw
thrust**



Open Airway

Look for signs of life

.... to confirm cardiac arrest



Cardiac arrest confirmed

Unresponsive?
Not breathing or
only occasional gasps

Call
resuscitation team



Cardiac arrest confirmed

Unresponsive?
Not breathing or
only occasional gasps

Call
resuscitation team

CPR 30:2
Attach defibrillator /
monitor
Minimise interruptions



BLS algorithm

If no circulation

identify the middle of the sternum

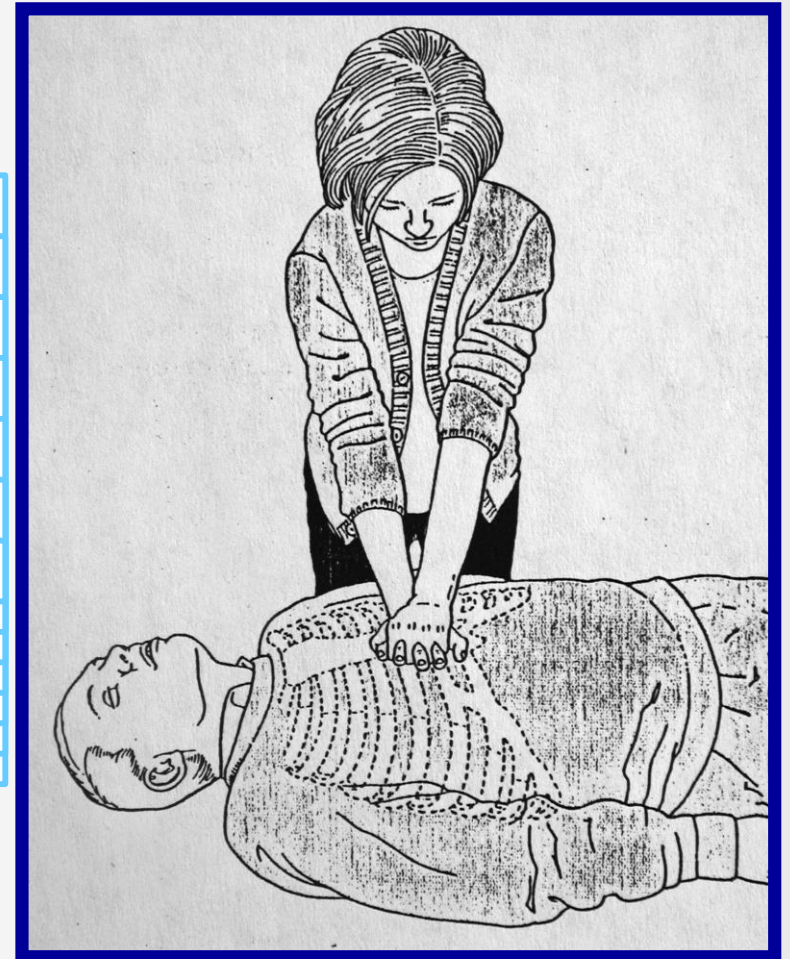
start ECM 30:2

use the heel of the hands

fingers interlocked

vertical above the patient chest

arms should be straight



Basic Life
Support
Algorithm

**Compress
the chest
to a depth
of 5-6 cm
and at a
rate of
100-120
min⁻¹.**



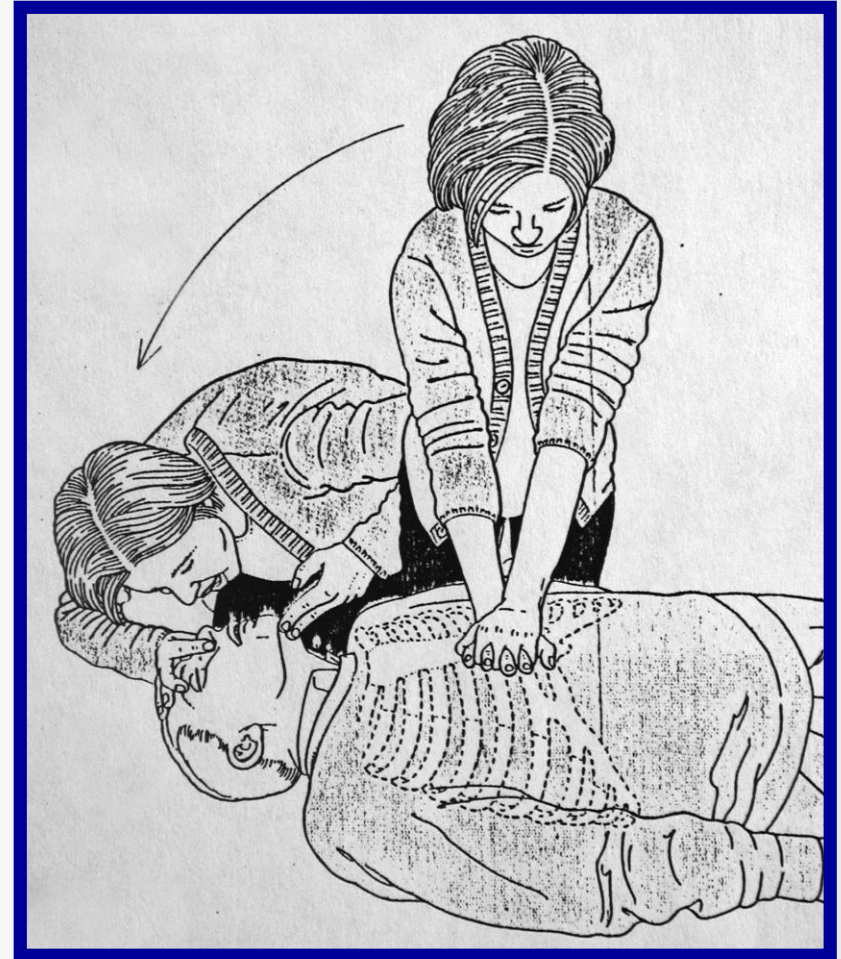
BLS algorithm

Continue resuscitation until

The pt shows signs of life

CPR team arrives

you become exhausted

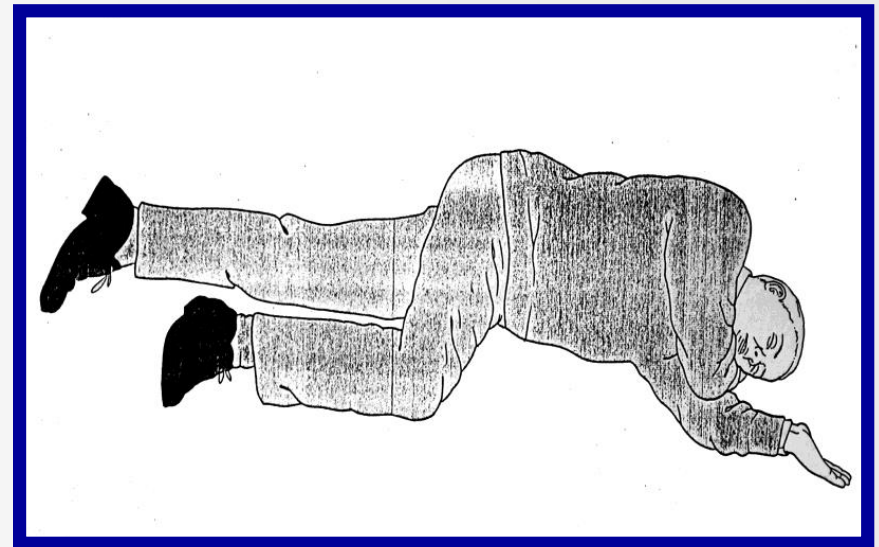


Recovery position

After breathing and circulation has been restored

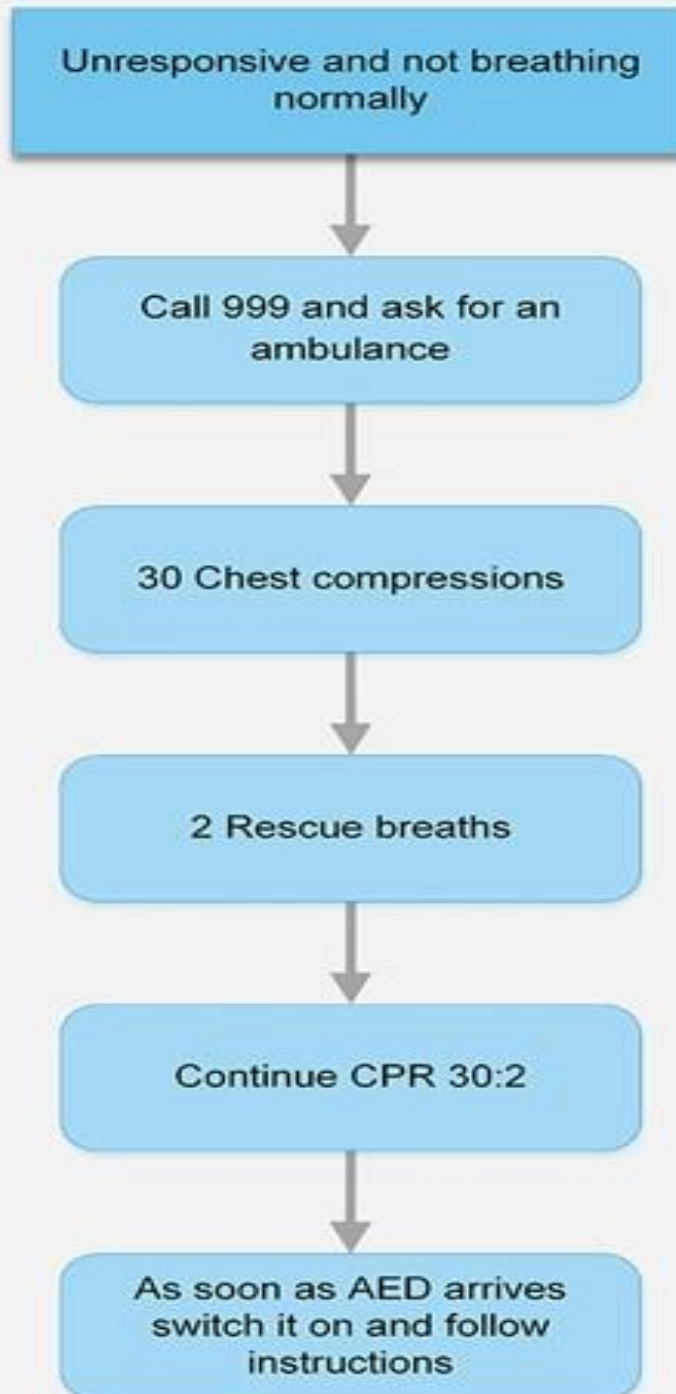
To maintain the opening of the airway

To prevent inhalation of gastric content



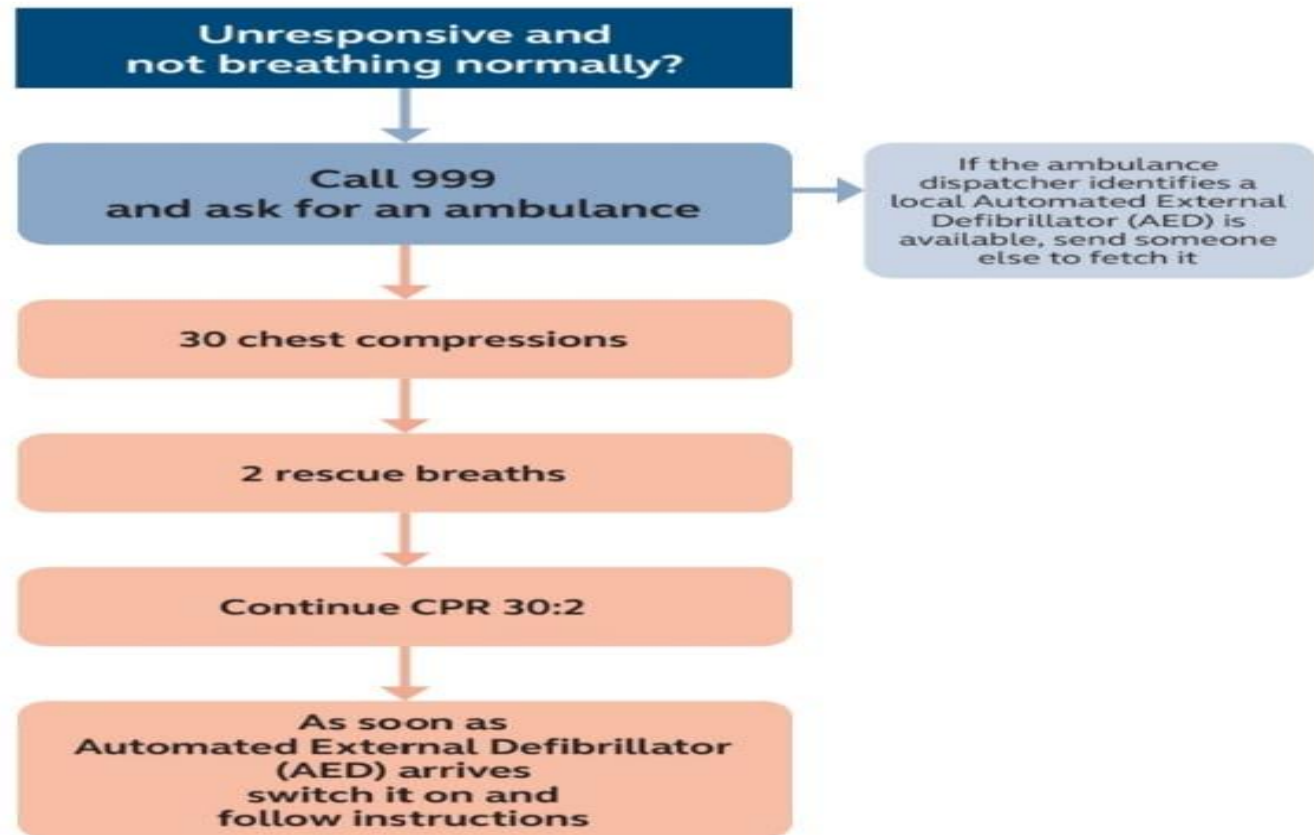
Key messages from Guidelines 2015

- Ensure it is safe to approach the victim.
- Promptly assess the unresponsive victim to determine if they are breathing normally.
- Be suspicious of cardiac arrest in any patient presenting with seizures and carefully assess whether the victim is breathing normally.
- For the victim who is unresponsive and not breathing normally:
 - Dial 999 and ask for an ambulance. If possible stay with the victim and get someone else to make the emergency call.
 - Start CPR and send for an AED as soon as possible.
 - If trained and able, combine chest compressions and rescue breaths, otherwise provide compression-only CPR.
 - If an AED arrives, switch it on and follow the instructions.
 - Minimise interruptions to CPR when attaching the AED pads to the victim.
- Do not stop CPR unless you are certain the victim has recovered and is breathing normally or a health professional tells you to stop
- Treat the victim who is choking by encouraging them to cough. If the victim deteriorates give up to 5 back slaps followed by up to 5 abdominal thrusts. If the victim becomes unconscious – start CPR.
- The same steps can be followed for resuscitation of children by those who are not specifically trained in resuscitation for children – it is far better to use the adult BLS sequence for resuscitation of a child than to do nothing.



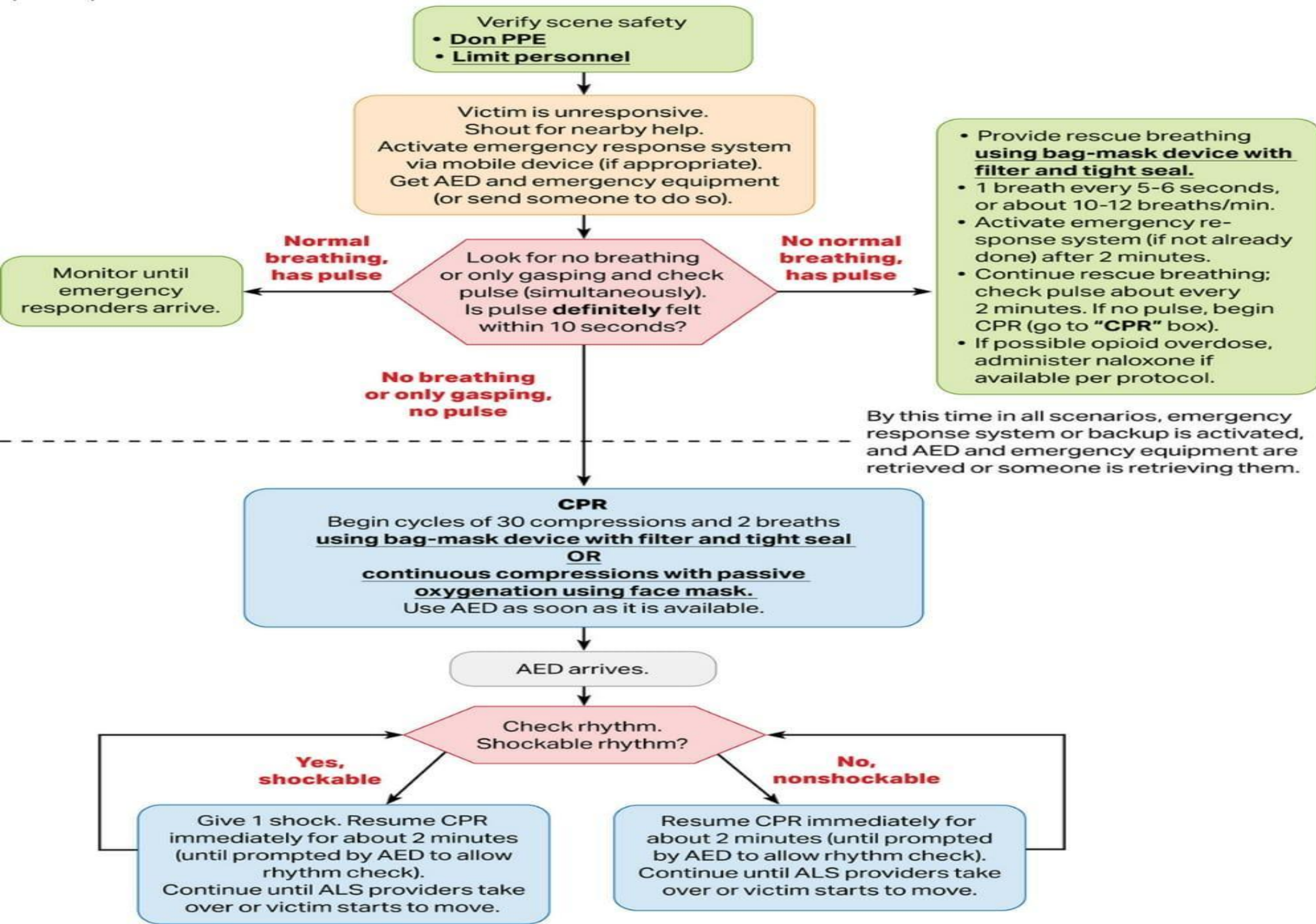


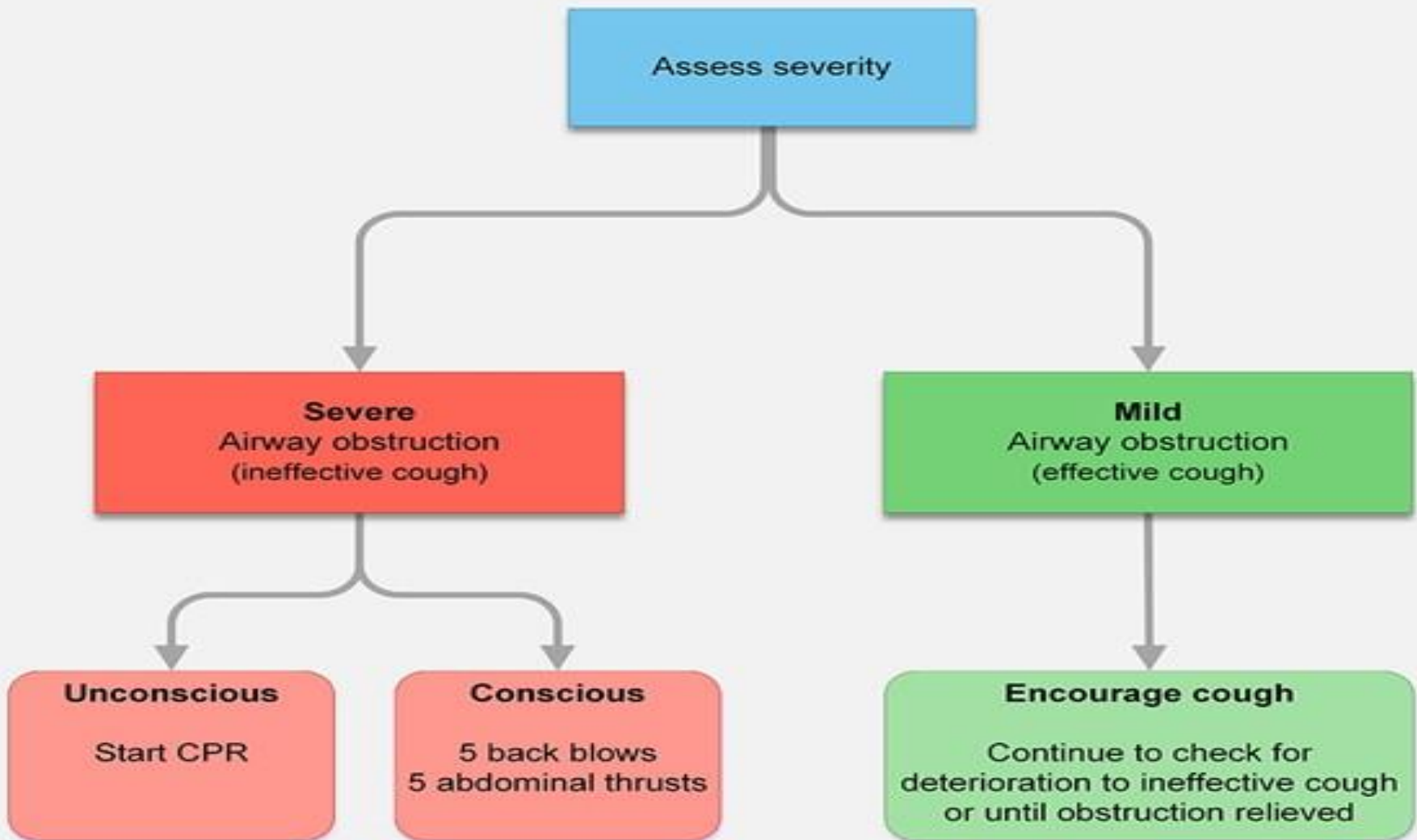
Adult basic life support in community settings



BLS Healthcare Provider Adult Cardiac Arrest Algorithm for Suspected or Confirmed COVID-19 Patients

Updated April 2020





Adult choking algorithm



Adult choking

