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# Resuscitation Covid-19 Guidelines

24/04/2020



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# Introduction

## « Transmission of Infections during Cardiopulmonary Resuscitation » Clinical Microbiology Reviews 28/07/2021

- Specifically for mouth-to-mouth ventilation, only 15 isolated cases of infection transmission have been reported, since its first medical use in 1744
- the risk of contracting COVID-19 infection during hands-only CPR performance without PPE is 1 bystander per 100 treated case
- a high index of suspicion, preparedness, and legitimate protection for possible cases can definitely eliminate the risk of transmission.
- What we really care about is the risk of transmission of disease and what PPE is required to protect us from that disease.





06/04/2020

# Caveats



- PPE is generally tested at rest, in idealized situations, which may not translate to real life practice. For example, doing chest compressions in PPE is incredible hard work, and can result in torn and loosened equipment, or sweating that interferes with the function of the equipment. (Shao 2020) **60-90% of people who pass an N95 fit test at rest will fail the test during active chest compressions. (Hwang 2020)**
- All of the **available evidence is an incredibly low level**, with a high risk of bias. It is worth reviewing, but we should avoid making any definitive conclusions.



Aerosol spread during CPR



Aerosol spread during CPR, Laryngeal Tube



Aerosol spread during CPR, reduction when a face mask is applied



Aerosol spread during CPR, Laryngeal Tube & Filter



Aerosol spread during CPR, Oxygen Mask



Aerosol spread during CPR, Intubation

CPR and COVID-19: Aerosol-spread during chest compressions  
03/04/2020

Ott, Matthias; Krohn, Alexander; Jaki, Christina; Schilling, Tobias; Heymer, Johannes

The following paper demonstrates how aerosol spread during CPR may be modified by different techniques. This is of utmost importance for medical providers during the COVID19 pandemic.





# Aerosol generating procedures



## Intubation

- Evidence of increased risk of transmission to healthcare workers? **YES**
- Is there evidence that this procedure can be done safely with a reduced level of PPE? **NO**

## Chest compressions

- Evidence of increased risk of transmission to healthcare workers? **PROBABLY**
- Is there evidence that this procedure can be done safely with a reduced level of PPE? **NO**
- The ILCOR statement is: “We suggest that chest compressions and cardiopulmonary resuscitation have the potential to generate aerosols (**weak recommendation, very low certainly evidence**).”



# Bag valve mask ventilation

- Evidence of increased risk of transmission to healthcare workers? **YES**
- Is there evidence that this procedure can be done safely with a reduced level of PPE? **NO**

There is only **a single study** and it suggests that BVM prior to intubation does increase risk of infectious transmission (OR 2.8 95% CI 1.3-6.4). (Tran 2012; Loeb 2004) **However, manual ventilation alone was not associated with a significantly increased risk (OR 1.3 95% 0.5-3.2)**

**BVM ventilation does increase risk, but if done well, with an excellent 2 hand grip, monitored with end tidal capnography, and a viral filter in place, that risk is likely small based on the numbers presented here.** The risk associated with BVM ventilations are not as high as the risk from intubation





# For Health Care Workers

## LEVEL 1 PPE

- Fluid resistant surgical mask
- Disposable gloves



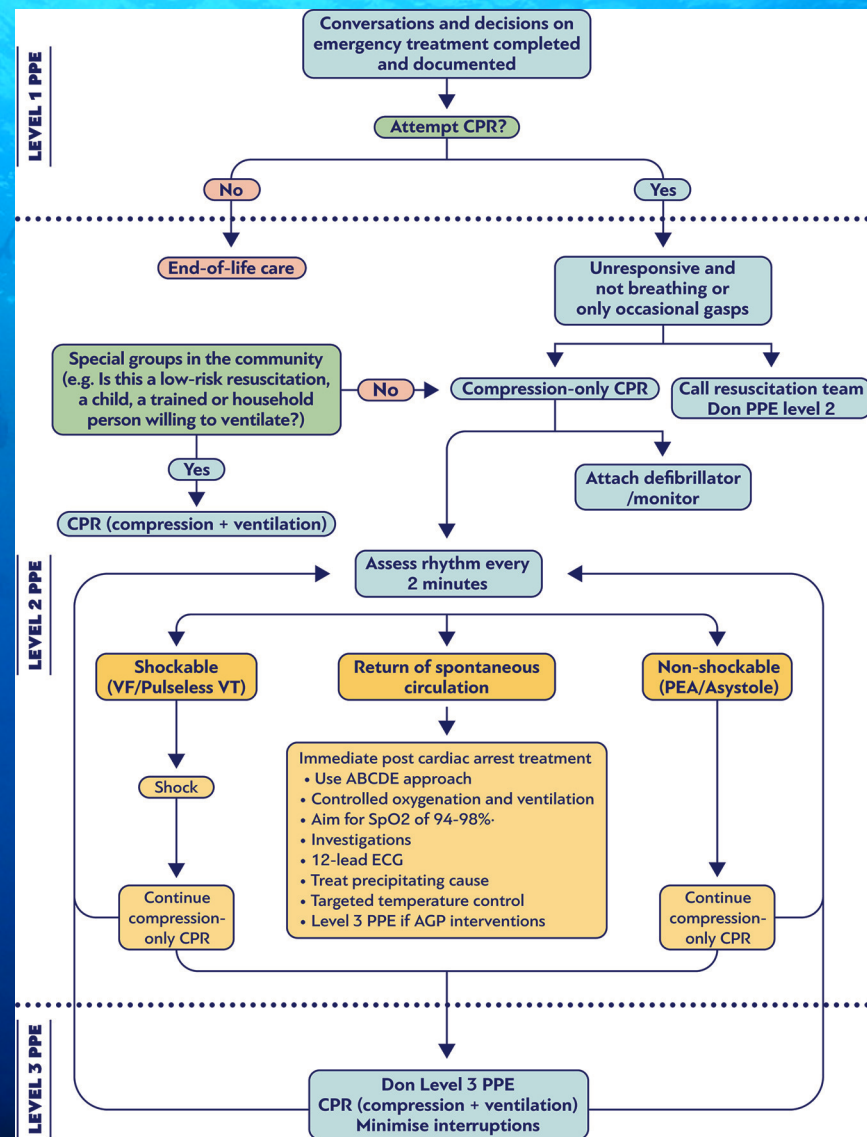
## LEVEL 2 PPE

- Disposable eye protection to be worn on risk assessment
- Protective disposable apron/gown
- Fluid resistant surgical mask or filtering facepiece respirator (N95/P2)
- Disposable gloves



## LEVEL 3 PPE

- Disposable eye protection, eye shield, goggles or visor
- Long sleeve fluid repellent disposable gown
- Filtering facepiece respirator (N95/P2)
- Disposable gloves





# ERC Guidelines 2021

The ERC guidelines were based on the ILCOR systematic review on COVID-19 and CPR and corresponding CoSTR. Since publication of these reviews, the search strategies have been re-run and a further four articles identified. **None of the new articles contained information sufficient to change the previous treatment recommendations.**

**The COVID-19 guidelines focus specifically on patients with suspected or confirmed COVID-19.** If there is uncertainty about the presence of COVID-19, those providing treatment should undertake **a dynamic risk assessment** which may consider current COVID-19 prevalence, the patient's presentation (e.g. history of COVID-19 contact, COVID-19 symptoms), likelihood that treatment will be effective, availability of personal protective equipment (PPE) and personal risks for those providing treatment.

**The main ERC Guidelines address resuscitation of those who are low risk or confirmed negative for COVID-19.**

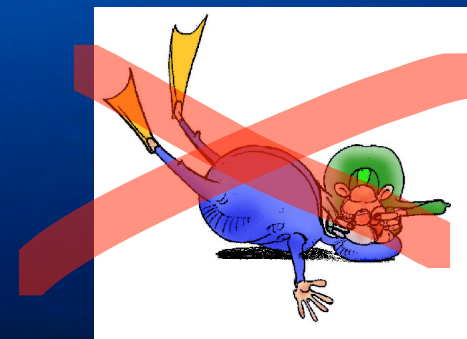




# BLS in adults by lay rescuers

## General recommendations for suspected or confirmed COVID-19

- When assessing breathing : In order to minimise the risk of infection, **do not open the airway** and **do not place your face next to the victims' mouth / nose**. (Hand on thorax can help)
- Lay rescuers should consider placing a cloth/towel over the person's mouth and nose before performing chest compressions and public-access defibrillation. This may reduce the risk of airborne spread of the virus during chest compressions
- BRC (outside vs inside the private or family circle)





# BLS in adults by EMS

## General recommendations for suspected or confirmed COVID-19

- For untrained rescuers, provide compression-only
- if there is a risk of infection, the responding healthcare personnel should be alerted immediately to enable them to take precautions such as donning airborne-precaution personal protective equipment (PPE).
- If first responders or trained volunteers have only droplet-precaution PPE, they should provide only defibrillation (if indicated), and no chest compressions, for patients with suspected or confirmed COVID-19.





# BLS in adults by healthcare personnel

## General recommendations for suspected or confirmed COVID-19

- Should be comprised only of healthcare workers with access to, and training in the use of airborne-precaution PPE.
- Recognise cardiac arrest by looking for the absence of signs of life and the absence of normal breathing.
- Healthcare professionals should always use airborne-precaution PPE for aerosolgenerating procedures (chest compressions, airway and ventilation interventions) during resuscitation.
- Perform chest compressions and ventilation with a bag-mask and oxygen at a 30:2 ratio



# BLS in adults by healthcare personnel

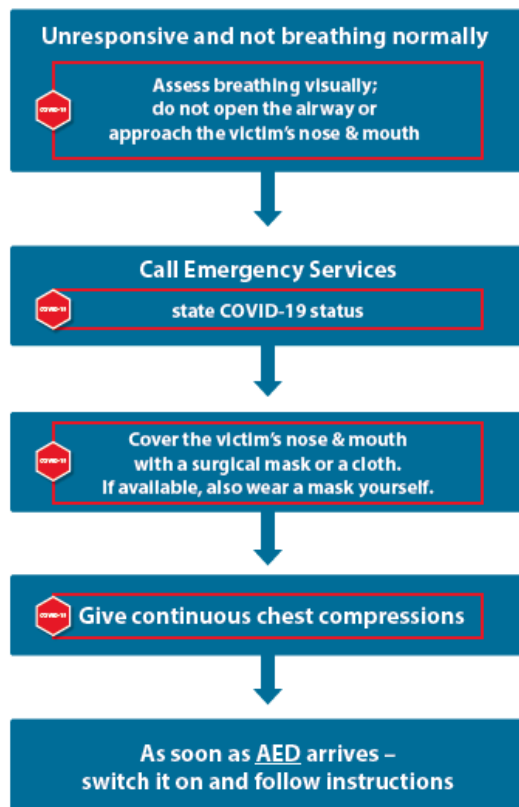
## General recommendations for suspected or confirmed COVID-19

- Use a high-efficiency particulate air (HEPA) filter or a heat and moisture exchanger (HME) filter between the self-inflating bag and the mask to minimize the risk of virus spread.
- Use two hands to hold the mask and ensure a good seal for bag-mask ventilation.
- This requires a second rescuer – the person doing compressions can squeeze the bag when they pause after each 30 compressions.



# Basic Life Support and Automated External Defibrillation (AED) adapted for COVID-19

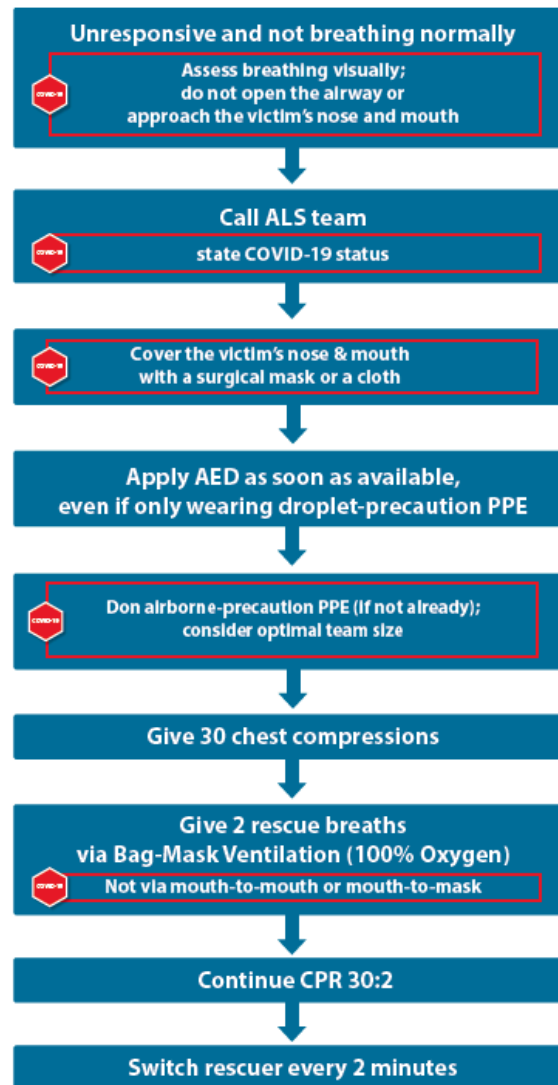
**for lay rescuers**



Lay rescuers should, as soon as possible, wash their hands thoroughly with soap and water or disinfect their hands with an alcohol-based hand-gel and contact the local health authorities to enquire about screening after having been in contact with a person with suspected or confirmed COVID-19

# Basic Life Support and Automated External Defibrillation (AED) adapted for COVID-19

**For trained healthcare providers**



**Bag-mask Ventilation:** use a 2-person technique (one person to provide mask seal, the other person provides compressions & also gives the ventilations); put a viral filter between bag & mask.

BLS teams less skilled or uncomfortable with bag-mask ventilation should place an oxygen mask on the patient's face, give oxygen and provide compression-only CPR



# Advanced Life Support

## Hypoxia

Follow the standard ALS algorithm when resuscitating patients with asphyxial cardiac arrest. Treat the cause of the asphyxia/hypoxaemia as the highest priority because this is a potentially reversible cause of the cardiac arrest.

Effective ventilation with the **highest feasible inspired oxygen is a priority in patients with asphyxial cardiac arrest.**

## Drowning

Treat life threatening hypoxia **with 100% inspired oxygen** until the arterial oxygen saturation can be measured reliably.

Cardiac arrest : Start resuscitation **as soon as safe** and practical to do so.

If trained and able this might include **initiating ventilations** whilst still in the water or providing ventilations and chest compressions on a boat.

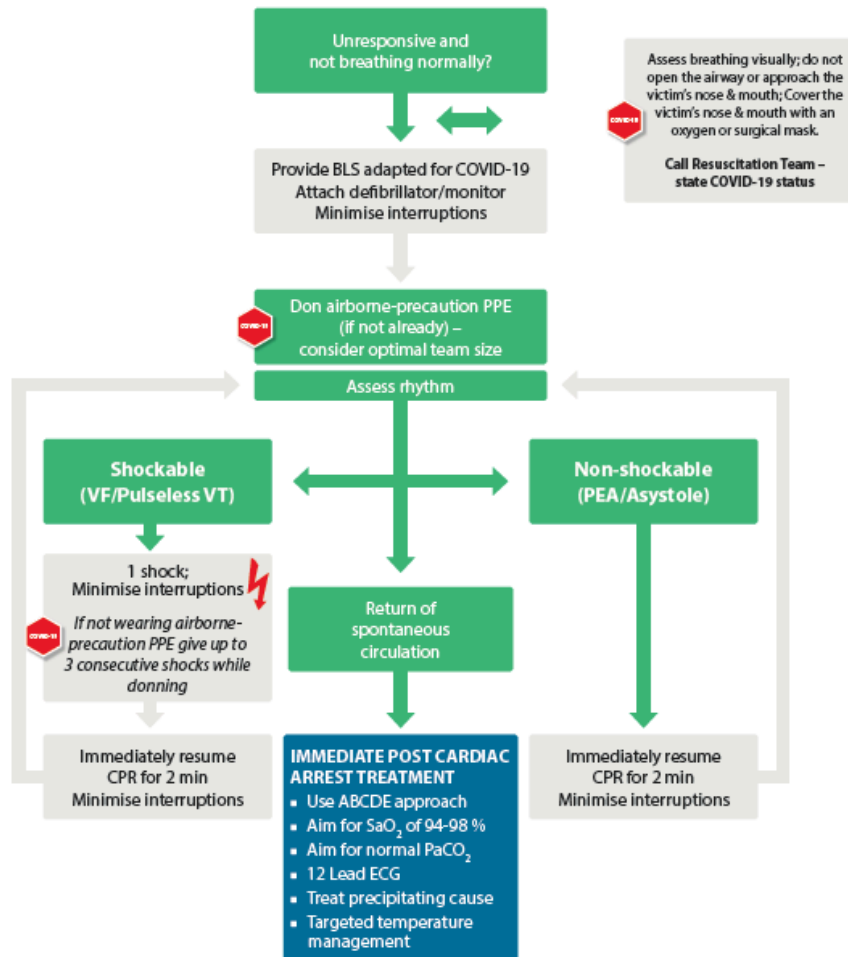
Start resuscitation **by giving 5 rescue breaths/ventilations using 100% inspired oxygen if available.**

If the person remains unconscious, without normal breathing, start chest compressions. Alternate 30 chest compressions to 2 ventilations. Apply an AED if available .....





# Advanced Life Support adapted for COVID-19



**COVID-19** (Red hexagon icon):

Consider early advanced airway management. Use a viral filter. Only perform continuous chest compressions (with 10 ventilations per minute) if trachea intubated.

## DURING CPR

- Ensure high quality chest compressions
- Minimise interruptions to compressions
- Give oxygen
- Use waveform capnography
- Vascular access (Intravenous or Intraosseous)
- Give adrenaline every 3-5 min
- Give amiodarone after 3 shocks

## TREAT REVERSIBLE CAUSES

- |                               |                                    |
|-------------------------------|------------------------------------|
| Hypoxia                       | Thrombosis – coronary or pulmonary |
| Hypovolaemia                  | Tension pneumothorax               |
| Hypo-/hyperkalaemia/metabolic | Tamponade – cardiac                |
| Hypothermia/hyperthermia      | Toxins                             |

## CONSIDER

- Ultrasound Imaging
- Mechanical chest compressions to facilitate transfer/treatment
- Coronary angiography and percutaneous coronary intervention
- Extracorporeal CPR



# ERC 2015 - section 4

## cardiac arrest in special circumstances

### Drowning

- In-water resuscitation by highly trained rescue teams with water rescue equipment is feasible. If trained and capable rescue teams are available, **initiate in-water resuscitation** for the unconscious and not-breathing patient by performing up to 1 min of ventilations (10 ventilations) before attempting transfer to land. If breathing is not restored, patient should be towed to the shore/boat without more attempts of ventilations during water rescue.
- ILCOR suggests that those who are trained, able and willing to **give rescue breaths** as well as chest compressions do so for all adult patients in cardiac arrest.







# What about asphyxia ?

**BRC (18/6/20)** idem CPR outside the private or family circle

a **pocket mask with a High-Efficiency Particulate Air (HEPA)** filter or a Heat and Moisture Exchanger (HME) filter **is an acceptable solution for providing ventilation.**  
**with two rescuers.**

- one rescuer will hold the pocket mask to the victim's face to prevent the chance of aerosolization leaks during chest compressions,
- and the other rescuer performs chest compressions and pauses for a few moments to administer breaths.

to maintain a good seal and to minimize the risk of contamination by aerosolization.

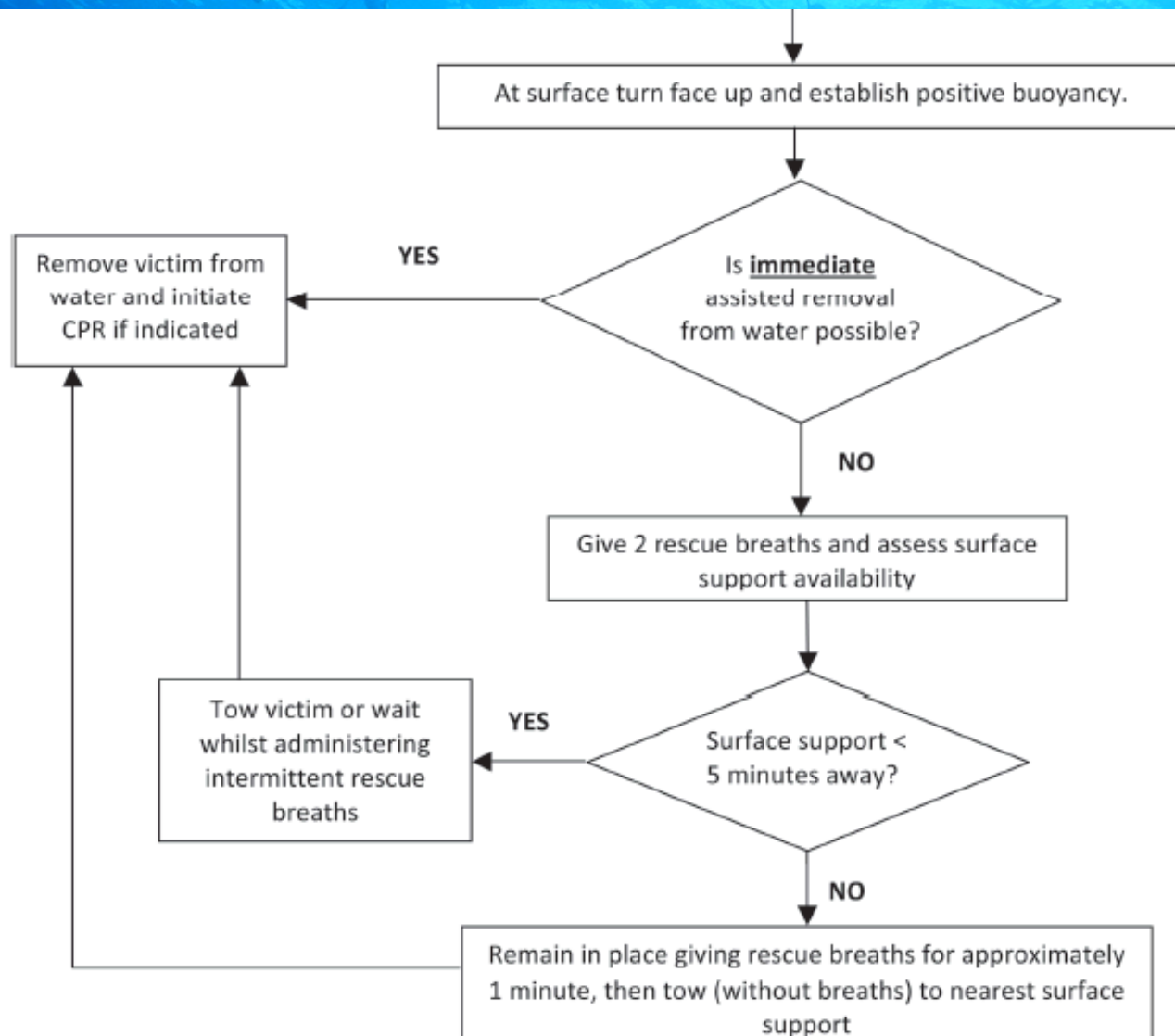
PPE (mask,..)

Those who have the authorization, have been trained and are familiar with the **bag valve mask technique** (BVM), must follow the 2015 guidelines and ventilate with the BVM with a viral filter HEPA placed between the bag and the mask (112 - Adapted VES - 5 ventilations - RCP 30 compressions and 2 ventilations).



# Recommendations

UHMS 2012, Vol. 39, No. 6 – Mitchell & co







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