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1. Definitions and Abbreviations

1.1 Definitions

For purposes of this procedure, unless otherwise stated, the following definitions shall apply:


Confirmed Cases: Positive SARS-CoV2/COVID-19 PCR.

Personal Protective Equipment: Clothing or equipment designed to be worn by someone to protect them from the risk of injury or illness.

Suspected Case: A person who has symptoms of COVID-19 and who is being tested for infection but has not found out the results of the test.

1.2 Abbreviations

For purposes of this procedure, unless otherwise stated, the following abbreviations shall apply:

AED: Automated External Defibrillation
AGP: Aerosol Generating Procedures
ALS: Advanced Life Support
BLS: Basic Life Support
BPM: Beats Per Minute
COVID-19: Coronavirus Disease 2019
CPR: Cardiopulmonary Resuscitation
DHHS: Department of Health and Human Services
ED: Emergency Department
EMR: Electronic Medical Record
ETT: Endotracheal Tube
HME: Heat and moisture Exchange
PPE: Personal Protective Equipment
SAED: Semi-Automatic External Defibrillation
WH: Western Health
2. References

   Green, K., Low, D. E., & SARS Investigation Team (2004). Possible SARS coronavirus transmission during cardiopulmonary

2. DHHS- Managing adult patient rapid response calls for known or suspected COVID-19 patients. Coronavirus (COVID-19) update
   14 June 2020


5. ILCOR: [COVID-19 infection risk to rescuers from patients in cardiac arrest](https://www.resuscitation.org.uk/)


7. NHS Scotland: [Aerosol Generating Procedures](https://www.nhs.scot)


    https://doi.org/10.1371/journal.pone.0035797


3. Overview

Western Health (WH) acknowledges that the COVID-19 pandemic has caused a high level of concern and uncertainty in regard to the most effective approach to adult resuscitation measures in patients with known or suspected COVID-19.

The aim of the procedure is to describe and outline the processes, management guidelines and responsibilities of all clinical staff in the provision of resuscitation to adults during COVID-19 pandemic to ensure early and timely management of a patient who has had a cardio-respiratory arrest with suspected or confirmed COVID-19.

WH remains committed to providing timely cardiopulmonary resuscitation (CPR) to all patients in cardiorespiratory arrest. Early initiation of CPR and early defibrillation provides the greatest chance of survival.

This procedure outlines processes referring to CPR of the ADULT PATIENT only.

For resuscitation of the neonate refer to Neonatal (including Newly Born) Resuscitation and for resuscitation of the Paediatric Patient refer to the clinical guide line for Paediatric Cardiopulmonary Resuscitation during the COVID-19 Pandemic on the WH COVID micro site.

4. Procedure Detail

It is essential to assess whether a deteriorating patient may meet the case definition for COVID-19 as part of the MET call/Code Blue response, and apply appropriate precautions.

In the event of a cardiac arrest of adult patients during the COVID-19 pandemic and if the patient is suspected or confirmed to have COVID-19:

STAFF SAFETY NEEDS TO BE PRIORITISED OVER RESUSCITATIVE EVENTS

It is important to ensure early identification of any patients with a COVID-19 like illness, who are at risk of acute deterioration or cardiac arrest. The early recognition of deterioration; and either escalation of care, or a decision for limitations of treatment is essential to reduce the probability of unexpected cardiac arrest.

4.1 Guiding Principles for the Management of Adult CPR

- CPR potentially causing aerosolisation of the COVID-19 virus
- If patient deterioration and/or arrest is anticipated, donning of appropriate PPE should occur in advance.
- If a patient is deemed at risk of deterioration and/or arrest ensure appropriate goals of care are in place. Consider ICU liaison Nurse Review. (Footscray Hospital and Sunshine Hospital Precinct only)
- If patient deterioration and/or arrest is unanticipated, initial compression only resuscitation, may be provided by the first responder after donning appropriate PPE.
- Minimise the number of staff in the room
- Resuscitation management of COVID suspected or Confirmed cases must occur in the highest level of isolation available in the clinical area. Preference from one to four is listed below, one most preferred and 4 least preferred.

Goals of care-resuscitation status (GOC) should be completed for all patients on admission and checked at first available opportunity by the MET /code Blue team responding to the patient

1. Negative pressure room
2. Single room with door closed.
4.2 Adult Basic Life Support (BLS)

For Non-COVID-19 patients (i.e. COVID-negative or not suspected it is appropriate to don gloves, eye-protection (such as face shield) and a surgical mask. If the patient is COVID-19 positive or suspected then airborne and contact precaution PPE including a gown and a P2/N95 mask is required.

NOTE: Full airborne PPE is available on all Adult resuscitation trolleys

4.2.1 D – Danger

- Ensure Adequate PPE and Staff Safety is priority.
- Check COVID status and don PPE as required
- Minimise responders to essential staff only

4.2.2 R – Response

- Recognise cardiac arrest by assessing for an absence of signs of life and normal breathing.
- This is best done by LOOKING for absence of signs of life, absence of normal breathing

4.2.3 S – Send for Help

- Call for assistance – emergency buzzer
- Call 444 - Adult Code Blue to activate organisational emergency response

4.2.4 A – Airway

- Avoid use of oropharyngeal airways.
- DO NOT listen or feel for breathing by placing face close to patient’s mouth
- Maintain the airway
  - Optimise head position
  - Consider simple airway manoeuvres; head-tilt, chin-lift or jaw thrust with Hudson mask on patient. Maintain maximum possible distance from patient’s airway (keep arms straight).
- Suction secretions if trained to do so and patient has obvious secretions/ blood/ vomit (routine suctioning not recommended). The yankauer suction device should be placed directly into appropriate waste bin straight after use (not lying freely on bed or under pillow), or placed back in its packaged if further use is anticipated.

4.2.5 B – Breathing

- Look for chest rise and fall of chest
- Apply oxygen via face mask at 10L/minute via Hudson mask
- If not breathing NO bag mask ventilation

4.2.6 C – Start CPR

- If no signs of life commence compression only CPR
- 100-120 compressions per minute

NOTE: DO NOT interrupt CPR except for a rhythm check or defibrillation
4.2.7  D – Defibrillate

- Attach AED as soon as available, follow prompts
- Place the pads in either the:
  1. Anterior – lateral position
  2. Anterior – posterior position
- Early rhythm check in AED mode
- AED will determine the cardiac rhythm: shockable or non-shockable
- Prior to rhythm check STOP O2 flow at wall (do not remove mask)
- Immediately following rhythm check (including shock delivery for a shockable rhythm) re-start O2 flow when compressions start

See Appendix One for BLS (with COVID-19 modifications) for further actions.

4.3 Adult Advanced Life Support (ALS)

4.3.1 Bag Valve Mask Ventilation

- During advanced life support (ALS) a bag valve mask (BVM) with a viral filter fitted, may be used by adequately trained clinicians, using the two-operator technique.
- Add a HME viral filter between the mask and the bag
- Select an appropriate sized mask
- Obtain air tight seal using 2 handed technique, second operator to squeeze the bag

![Image 1: Bag valve mask with HME viral filter](image)

4.3.2 Intubation

- Early intubation by an experienced airway operator
- Video laryngoscope recommended
- **Viral filter must be placed in circuit closest to airway device**
- Minimise disconnections
4.3.3 Defibrillation

Use COACHED for ALS rhythm checks

- Intubated = closed circuit, do not disconnect for defibrillation

See Appendix TWO for ALS Advanced Life Support Algorithm (with COVID-19 considerations) for further actions.

4.3.4 Reversible Causes

In a cardiac arrest of presumed hypoxic aetiology early ventilation with oxygen is usually advised. PPE as per the WH guidelines is required before ventilation occurs.

Early airway management on CODE BLUE team arrival will be critical.

4.4 Role Allocation, Protective Equipment and Responsibilities

<table>
<thead>
<tr>
<th>Role</th>
<th>*TIER 0 &amp; 1 Patients Minimum PPE Precautions</th>
<th>**TIER 2 &amp; 3 Patients Contact &amp; Airborne Precautions (Inc. ALL Code Blue Responders)</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedside Nurse</td>
<td>✓</td>
<td>✓</td>
<td>NOTE: Once this nurse has donned initial, appropriate PPE; responsibility is to:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Call for help</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Apply wall oxygen via Hudson mask at 10L/minute</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Commence delivery of chest compressions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Provides communication</td>
</tr>
<tr>
<td>First Responder – 2nd RN</td>
<td>✓</td>
<td>✓</td>
<td>- Dons appropriate PPE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Confirms emergency code activation has occurred</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Takeover / assists the bedside nurse</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Controls/minimise people entering room</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Passes in equipment as required</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Provides communication</td>
</tr>
<tr>
<td>Response Team - Team Leader</td>
<td></td>
<td>✓</td>
<td>- Runs the resuscitation, coordinates the team members and care provided.</td>
</tr>
<tr>
<td>Response Team - Airway</td>
<td></td>
<td>✓</td>
<td>- Airway management including:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Oxygenation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Ventilation ensuring two person technique for BVM with viral filter is maintained</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Early intubation</td>
</tr>
<tr>
<td>Response Team - Circulation</td>
<td></td>
<td>✓</td>
<td>- Circulation Management:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Vascular/intraosseous access</td>
</tr>
<tr>
<td>Response Team - CPR</td>
<td></td>
<td>✓</td>
<td>- Delivery of chest compressions</td>
</tr>
<tr>
<td>Response Team - Scribe</td>
<td></td>
<td>✓</td>
<td>- Documentation of all the treatment progressively during resuscitation</td>
</tr>
<tr>
<td>Float/Runner</td>
<td>✓</td>
<td>✓</td>
<td>- Assist in obtaining equipment, medication, fluids as required.</td>
</tr>
</tbody>
</table>

* Tier 1 & 0 PPE: Surgical mask, eye protection and gloves

** Tier 2 & 3 Airborne Precautions: N95 mask, eyes protection, gown and gloves

See [PPE - Western Health COVID-19 PPE Guideline V5 17.06.20](#)
The treatment goal is to return the patient to a state of normal cerebral function and to establish and maintain a stable cardiac rhythm and normal haemodynamic function. Post resuscitation care is provided through blood pressure control, oxygenation, control of arterial carbon dioxide, blood glucose control, prophylactic anti arrhythmic agents, temperature control, sedation and paralysis, seizure control and the treating of underlying causes of the cardiac arrest

- Re-evaluate ABCD
- Ensure airway and breathing are managed effectively, including intubation if not already performed. DO NOT extubate.
- Ventilate to normal CO₂
- Arrange chest CXR to confirm ETT desired position and check for complications of CPR (pneumothorax, rib fractures, aspiration)
- Maintain normal blood pressure appropriate with the use of inotropes as required
- Check haemoglobin, pH, electrolytes and glucose and correct as necessary
- Aim for temperature 32° C - 36°C
- Use adequate sedation/analgesia
- If clinically indicated test for coronavirus once the patient is stable: PCR of the throat and nasopharyngeal swab.

Table 1. Considerations for Post Resuscitation Care Following Return of Spontaneous Circulation

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>Haemodynamic goals should be contextualised to the patient - aiming for a blood pressure equal to the patients base line pressure or a systolic of at least greater than 100mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygenation</td>
<td>Avoid hypoxia. On ROSC target SpO₂ between 94 to 96%</td>
</tr>
<tr>
<td>Arterial Carbon Dioxide</td>
<td>Maintain normocarbia</td>
</tr>
<tr>
<td>Prophylactic Antiarrhythmic Agents</td>
<td>It is reasonable to continue an antiarrhythmic infusion if used so during resuscitation or can be considered to prevent recurrence of VF</td>
</tr>
<tr>
<td>Temperature Control</td>
<td>Targeted temperature control is recommended to avoid hyperthermia post resuscitation.</td>
</tr>
<tr>
<td>Blood Glucose Control</td>
<td>Standard blood sugar level protocols should be used.</td>
</tr>
<tr>
<td>Sedation and Paralysis</td>
<td>As required per patient needs.</td>
</tr>
<tr>
<td>Seizure Control</td>
<td>Routine seizure prophylaxis is not recommended. Therapy should be enlisted as required.</td>
</tr>
<tr>
<td>Treating Underlying Causes of the Cardiac Arrest</td>
<td>Identification of cause of cardiac event and treatment of cause is recommended. Emergency cardiac catheterisation, evaluation and treatment if indicated.</td>
</tr>
</tbody>
</table>

4.6 Decision Making

In many cases, cardiac arrest in patients with COVID-19 will be an irreversible deterioration of cardiopulmonary function (e.g. hypoxaemic cardiac arrest) that cannot be reversed by standard ALS procedures. However, arrhythmia may occur from myocarditis in COVID-19 patients and may respond to defibrillation. Patients with COVID-19 disease may also suffer cardiac arrest due to reversible causes related to other disease processes such as myocardial infarction or pulmonary embolism.
The conversations and decision-making processes around ceasing resuscitation must continue and should be individualised unless directives state otherwise.

Ensure decisions and conversations around goals of care and treatment limitations are well documented in the EMR and communicated. Early referral to ICU essential

4.7 MET/Code Blue Team Response Modifications

Appropriate PPE should be stored on all emergency trolleys and MET bags should contain PPE suitable for AGP. MET Call or Code blue notification through switch as per normal processes.

Ward team to notify MET / Code blue team on arrival of patient COVID-19 status. The MET/code Blue team should put on appropriate PPE prior to taking over from initial responders.

4.7.1 PPE For Adult Code Blues- BLS First Responders

**Tier 0 & 1 patients**: Non COVID-19 case (cleared or not suspected) OR In areas of higher clinical risk and where the person is cleared, NOT suspected or confirmed to have COVID-19 and is not in quarantine.

**ALL** BLS first responders to don surgical mask, face shield, and disposable gloves for **ALL** Tier 0 & Tier 1 Patients given code blue potential for:

- High risk AGPs,
- Chest compressions
- Planned intubation, or airway management

See Appendix Three for PPE for adult code blues - BLS First Responders - Tier 0 & 1.

Areas of higher clinical risk – ICU, ED Designated COVID wards, RACs

4.7.2 PPE For Adult Code Blues- ALS Code Responders

Airborne and droplet precautions PPE to be worn for **ALL** Code Blue activations. **ALL** ALS code responders to don **P2/N95 mask, face shield, long sleeved gown and disposable gloves** for **ALL** Tier 2 & Tier 3 Patients when:

- COVID suspected or confirmed, or when droplet or airborne precautions are in place.
- Planned intubation, or airway management required.
- Undertaking high risk AGPs
- Chest compressions
- **ALL Code Blue no treating team (public areas).**

See Appendix Three for PPE for adult code blues - BLS First Responders - Tier 2 & 3.
See Appendix Four for PPE for adult code blues – ALS Code Responders

4.8 Guiding Principles For The Management Of Adult Code Blue Activations

- Resuscitation Trolleys must remain outside the room and necessary equipment brought into room for All Suspected and Confirmed COVID19 patients.
- Modifications to the ANZCOR guidelines as outlined above should be implemented by the MET/CODE Blue Team.
- Early recognition of deterioration and activation of a MET call or escalation through normal internal process in may prevent cardiac arrests. Early ICU notification is essential.
Western Health

Appendix One – ADULT Basic Life Support

COVID-19 Pandemic

Basic Life Support

- Check COVID status and don’t proceed if required to
- Look for absence of signs of life
- Send for help
- Responsive?
- Dangerous?
- Normal Breathing?
- Open Airway
- Avoid bag mask ventilation to patient’s mouth
- Basic CPR
- Stop CPR, flow at will
- Early Rhythm check in AED mode
- Start CPR
- Attach Defibrillator (AED)
- 30-30-200 compression/minute
- CPR Unit Response or normal breathing return
- Continue CPR unit response

Adult Cardiopulmonary Resuscitation during the COVID-19 Pandemic
Appendix TWO – ADULT Advanced Life Support

**Advanced Life Support for Adults**

**COMPRESSION ONLY CPR**
- Until code response team arrives

**Non-Shockable**
- Post Resuscitation Care

**Shockable**
- Use COACHED for ALS rhythm checks
- Intubated = closed circuit, do not disconnect for defibrillation

**Check COVID status and PPE as per guideline**
- Minimise responders to essential staff only

**Advanced modifications for ALL patients during the COVID-19 pandemic**

**Early intubation**
- Operator: experienced airway
- (video laryngoscope recommended)

**During a cardiac arrest, take place outside of a negative pressure room**

**Minimise disconnections**
- Device must be placed in circuit closest to airway
- Viral filter must be
Appendix THREE- PPE FOR ADULT CODE BLUES: BLS First Responders

PPE FOR ADULT CODE BLUES - BLS First Responders

TIER 0 & TIER 1 Patients
(as per WI PPE guidelines)

Ward Responders
(Basic Life Support)

- Surgical mask
- Face shield
-丁ensable gloves
- Hand hygiene above the elbow afterwards.

First Responders are SAFE to commence chest compressions in the PPE as shown for Tier 0 & Tier 1 patients given code blue potential for:

TIER 2 & TIER 3 Patients
(as per WI PPE guidelines)

Ward Responders
(Basic Life Support)

- P2/N95 mask
- Face shield
- Disposable long sleeved (yellow) gown
- Hand hygiene above the elbow afterwards.

PPE during COVID-19

PPE FOR ADULT CODE BLUES - BLS First Responders

<table>
<thead>
<tr>
<th>TIER</th>
<th>For use in</th>
<th>Hand hygiene</th>
<th>Disposable gloves</th>
<th>Single use plastic apron</th>
<th>Disposable long sleeve isolation gown</th>
<th>Surgical mask</th>
<th>P2/ N95 respirator</th>
<th>Eye protection (face shield / goggles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIER 0</td>
<td>Non COVID-19 case (closed or not suspected)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>TIER 1</td>
<td>ICU, ED, Designated COVID wards, ICU</td>
<td>As per standard precautions</td>
<td>As per standard precautions</td>
<td>As per standard precautions</td>
<td>As per standard precautions</td>
<td>As per standard precautions</td>
<td>As per standard precautions</td>
<td>As per standard precautions</td>
</tr>
<tr>
<td>TIER 2</td>
<td>Direct care or contact with a person who is suspected or confirmed to have COVID-19 or is in quarantine or where a history cannot be obtained.</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>TIER 3</td>
<td>Airborne and contact precautions</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>

COVID – 19
Version 8.1
23 June 2020
Appendix FOUR- PPE FOR ADULT CODE BLUES: ALS Code Responders

PPE FOR ADULT CODE BLUES- ALS Code Responders

Code Blue Team
(Advanced Life Support)

ALL Code Blue Responders are SAFE to Respond to ALL Code Blue activations in the PPE as shown:

- P2/N95 mask
- Face shield
- Disposable long sleeved (yellow) gown
- Gloves
- Hand hygiene to above the elbow afterwards.

Commence COVID-19 modified adult ALS

Please be advised that these PPE Guidelines may be subject to change.