

## Frequently Asked Questions relating to the rapidly deteriorating / cardiac arrest situation in Children in the context of COVID-19 infection

- In children cardiac arrest is unlikely to be due to primary cardiac disease but more commonly to respiratory causes, making the rapid restoration of oxygenation and ventilation crucial to the child's chances of survival
- This guidance relates to in-hospital care where mouth to mouth ventilation should not be necessary as equipment necessary for bag-mask ventilation and intubation should always be immediately available
- Cardio-pulmonary resuscitation should be regarded as an aerosol-generating procedure<sup>1,2,3</sup>, and full PPE should be donned as rapidly as possible in suspected/ covid +ve patient or in those in whom covid status is unknown, while others are initiating life-saving interventions in the child
- This guidance acknowledges that PHE advice regarding the use of PPE may evolve [PHE PPE advice for health care workers in secondary care](#)
- It is essential that all teams prepare for donning PPE in the event of a rapidly deteriorating patients through simulation, role assignation, and designation of equipment and resuscitation trolleys

Question	Response	PPE advice
<i>How do I know whether or not my patient might have covid disease?</i>	Covid disease should be suspected in: a) any child who meets the PHE case definition <a href="#">here</a> b) any child who has been screened for Covid-19 infection and in whom the result is positive c) any child who has been screened for Covid-19 infection and in whom the result is awaited	N/A

<sup>3</sup> On 24<sup>th</sup> April, the New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) concluded that chest compressions / defibrillation not be regarded as an AGP. However, since most cardiovascular collapse in children is secondary to respiratory causes and bag valve mask ventilation/intubation is therefore vital in restoring circulation, it is recommended that full PPE be part of paediatric resuscitation as set out in this guidance

## Approach to the child with suspected/ +ve COVID-19 infection in a higher risk acute care area (ICU/ HDU, ward with NIV, ED resus areas, operating theatres where AGPs common)

Question	Response	PPE advice
<i>My patient is intubated, and is desaturating..what should I do?</i>	The important thing is to try and not disconnect the child from the ventilator. Therefore: <ol style="list-style-type: none"> <li>1. Increase oxygen to 100%</li> <li>2. Check ETCO<sub>2</sub> trace</li> <li>3. Increase PiP, Vt, and ventilator rate as necessary</li> </ol>	Staff should already be wearing full PPE <b>Full PPE = FFP3 mask, glasses/visor, long sleeved gown, plastic apron, and gloves</b>
<i>My patient is intubated and now becoming bradycardic..what should I do?</i>	Commence measures as above, and: <ol style="list-style-type: none"> <li>1. Stimulate the patient</li> <li>2. Consider 4 Hs and 4 Ts</li> <li>3. Alter inotrope infusions</li> <li>4. If HR &lt; 60 start chest compressions and follow RCUK COVID-19 resus protocol<sup>4</sup></li> </ol>	Staff should already be wearing full PPE <b>Full PPE = FFP3 mask, glasses/visor, long sleeved gown, plastic apron, and gloves</b>
<i>I can't adequately ventilate my child..what should I do?</i>	If you need to disconnect your patient from the ventilator to begin bag-mask ventilation, then: <ol style="list-style-type: none"> <li>1. Switch the ventilator to stand-by</li> <li>2. Clamp the ETT tube</li> <li>3. Attach the bagging circuit with an HME filter or preferably a viral/bacterial filter</li> <li>4. Unclamp ETT and bag patient</li> <li>5. When cardiac arrest resolved, clamp ETT, turn off flow to bagging circuit, attach ventilator to patient, remove any HME that was inserted for bagging, restart ventilator, un-clamp ETT</li> </ol>	Staff should already be wearing full PPE <b>Full PPE = FFP3 mask, glasses/visor, long sleeved gown, plastic apron, and gloves</b>
<i>Is there any special approach I should be taking regarding bagging?</i>	When using a bagging circuit try and aim the 'exhaust' away from the staff If bagging a patient via a mask then, if possible, use a 2 handed grip on the mask to reduce leaks and aerosol generation	Staff should already be wearing full PPE <b>Full PPE = FFP3 mask, glasses/visor, long sleeved gown, plastic apron, and gloves</b>
<i>What HME filter should I be using with the bagging circuit?</i>	It is important to use the correct size HME filter for your patient (the dead spaces for micro, mini, and standard are 11, 34, and 60ml). Importantly, when the child is connected back on to the ventilator, these filters may become waterlogged and blocked in a circuit with active humidification. This risk should be mitigated through the use of a bacterial/viral filter instead.	N/A
<i>My patient is not on a ventilator (is breathing spontaneously or on NIV) but desaturating..what should I do?</i>	Call for help Do not listen or feel for breathing by placing your ear/cheek close to patient's mouth Open airway and give 15 l/min oxygen via face mask with reservoir bag, or if on NIV increase delivered oxygen to 100% Attach monitoring	Staff should already be wearing full PPE <b>Full PPE = FFP3 mask, glasses/visor, long sleeved gown, plastic apron, and gloves</b>
<i>My patient is not on a ventilator (is breathing</i>	Call for help Open airway	Staff should already be wearing full PPE

<p><i>spontaneously or on NIV) but now becoming bradycardic..what should I do?</i></p>	<p>Increase delivered oxygen to 100%</p> <ul style="list-style-type: none"> <li>• Stimulate the patient</li> <li>• Consider 4 Hs and 4 Ts</li> <li>• If HR &lt;60 start cardiac compressions and follow RCUK COVID-19 resus protocol<sup>4</sup></li> </ul>	<p><b>Full PPE = FFP3 mask, glasses/visor, long sleeved gown, plastic apron, and gloves</b></p>
<p><i>My patient has now gone into cardiorespiratory arrest</i></p>	<p>Follow RCUK COVID-19 protocols          Bag mask ventilate with HME/viral filter attached to circuit<sup>5</sup>          Give adrenaline and DC shocks as indicated          Prepare to intubate<sup>5</sup></p>	<p>Staff should already be wearing full PPE  <b>Full PPE = FFP3 mask, glasses/visor, long sleeved gown, plastic apron, and gloves</b></p>
<p><i>What advice regarding PPE should be given to other professionals arriving at the arrest?</i></p>	<p>N/A</p>	<p>Other professionals arriving at the arrest may not be in full PPE. They should don full PPE as quickly as possible.          The person leading the arrest should try and minimise the number of people in the cubicle or the immediate vicinity of the bed.</p>

## Approach to the child with suspected/+ve COVID-19 infection in an inpatient area where direct patient care < 2m (wards, emergency department, acute assessment areas)

Question	Response	PPE advice
<i>My patient is desaturating..what should I do?</i>	<p>Call for help</p> <p>Do not listen or feel for breathing by placing your ear/cheek close to patient's mouth</p> <p>Open airway and give 15 l/min oxygen via face mask with reservoir bag</p> <p>Attach monitoring</p>	<p>Attending staff should be wearing <b>Basic level PPE = gloves, plastic apron, surgical mask, glasses/visor.</b></p> <p>Arriving staff should <b>donn full PPE as quickly as possible</b> to enable them to be part of the resuscitating team, and those staff in basic PPE should withdraw to a distance of more than 2 m once bagging commenced.</p>
<i>My patient is now becoming bradycardic..what should I do?</i>	<p>Call for help</p> <p>Open airway</p> <p>Increase face mask oxygen to 100%</p> <ol style="list-style-type: none"> <li>1. Stimulate the patient</li> <li>2. Consider 4 Hs and 4 Ts</li> <li>3. If HR &lt;60 start cardiac compressions and follow RCUK COVID 19 resus protocol<sup>4</sup></li> </ol>	<p>Attending staff should be wearing <b>Basic level PPE = gloves, plastic apron, surgical mask, glasses/visor.</b></p> <p>Arriving staff should <b>donn full PPE as quickly as possible</b> to enable them to be part of the resuscitating team, and those staff in basic PPE should withdraw to a distance of more than 2 m once chest compressions started.</p>
<i>What advice regarding PPE should be given to other professionals arriving at the arrest?</i>	N/A	<p>Other professionals arriving at the arrest may not be in full PPE. They <b>should don full PPE as quickly as possible.</b></p> <p>The person leading the arrest should try and minimise the number of people in the immediate vicinity.</p>
<i>Is there any special approach I should be taking regarding bagging?</i>	<p>When using a bagging circuit try and aim the 'exhaust' away from the staff</p>	<p>Bagging is an AGP. While attending staff should be wearing <b>Basic level PPE = gloves, plastic apron, surgical mask, glasses/visor,</b> arriving staff should <b>donn full PPE as quickly as possible</b> to enable those staff in basic PPE to withdraw to a distance of more than 2m.</p>
<i>What HME filter should I be using with the bagging circuit?</i>	<p>It is important to use the correct size HME filter for your patient (the dead spaces for micro, mini, and standard are 11, 34, 60ml).</p>	N/A
<i>My patient has now gone into cardiorespiratory arrest</i>	<p>Follow RCUK COVID-19 protocols<sup>4</sup></p> <p>Bag mask ventilate with HME/viral filter attached to circuit<sup>5</sup></p> <p>Give adrenaline and DC shocks as indicated</p> <p>Prepare to intubate<sup>4</sup></p>	<p>Attending staff should be wearing <b>basic level PPE.</b></p> <p>Arriving staff should <b>donn full PPE as quickly as possible</b> to enable them to be part of the resuscitating team, and those staff in basic PPE should withdraw to a distance of more than 2 m once chest compressions started, Do not intubate/ventilate without full PPE.</p>
<i>Full PPE is not immediately available.. what should I do?</i>	<p>This is a very difficult situation and one that the attending team should not find themselves in. In a life and death situation, a judgment should be made by the professional leading the arrest team based upon the likelihood of the patient being positive and risk to staff.</p>	<p>If full AGP PPE is not immediately available, then don as much PPE as is available. As a very minimum glasses/visor must be worn on top of the highest level mask available.</p>

## Approach to the child with suspected/ +ve COVID-19 infection in an inpatient area where direct patient care > 2m

Question	Response	PPE advice
<i>My patient is desaturating and/or bradycardic and / or in cardiac arrest...what should I do?</i>	Follow advice above and RCUK COVID-19 protocols <sup>4</sup>	Attending staff should be wearing surgical mask and eye protection. Arriving staff should <b>donn full PPE as quickly as possible</b> to enable them to be part of the resuscitating team. The person leading the arrest should try and minimise the number of people in the immediate vicinity.
<i>Full PPE is not immediately available.. what should I do?</i>	This is a very difficult situation and one that the attending team should not find themselves in. In a life and death situation, a judgment should be made by the professional leading the arrest team based upon the likelihood of the patient being positive and risk to staff.	If full AGP PPE is not immediately available, then don as much PPE as is available. As a very minimum glasses/visor must be worn on top of the highest level mask available.

## Approach to the child who is proven COVID-19 negative in an inpatient area

Question	Response	PPE advice
<i>My patient is desaturating and/or bradycardic and / or in cardiac arrest...what should I do?</i>	Follow usual RCUK protocol <sup>4</sup>	Follow local guidance. Many hospitals are advocating surgical masks/eye protection or <b>basic level PPE</b> for routine care of patients.

### References:

1. Resuscitation Council UK statement on Covid-19 in relation to CPR  
<https://www.resus.org.uk/media/statements/resuscitation-council-uk-statements-on-covid-19-coronavirus-cpr-and-resuscitation/covid-paediatrics/>
2. ESPNIC guidance for the care of the deteriorating child  
<https://espanic-online.org/News/Latest-News/Guidance-for-the-care-of-the-deteriorating-child-or-in-cardiac-arrest-with-suspected-or-proven-COVID-19-infection>
3. PHE statement regarding NERVTAG review  
<https://www.gov.uk/government/publications/wuhan-novel-coronavirus-infection-prevention-and-control/phe-statement-regarding-nervtag-review-and-consensus-on-cardiopulmonary-resuscitation-as-an-aerosol-generating-procedure-agp>
4. Resuscitation Council UK statements on Covid-19, CPR, and Resuscitation  
<https://www.resus.org.uk/media/statements/resuscitation-council-uk-statements-on-covid-19-coronavirus-cpr-and-resuscitation/covid-resources-paediatrics/>
5. Paediatric Airway Management Guidance (covid-19) including airway management checklist.  
<https://icmanaesthesiacovid-19.org/covid-19-paediatric-airway-management-principles>