CARE OF PATIENTS WITH CONFIRMED OR SUSPECTED COVID-19 IN CICU

COVID-19 STANDARD OPERATING PROCEDURE©

KEY POINTS UPDATED 28TH SEPTEMBER 2020

FURTHER REVIEW: INFECTIOUS DISEASES/INFECTION CONTROL

- Guideline is designed to guide all clinical staff on caring for critically unwell children with suspected or confirmed COVID-19 infection in CICU
- This guideline refers to the care of patients with confirmed or suspected Therefore this document does not apply once a patient is deemed COVID-19 negative
- Document has been developed using best available information to date. Guidance may change due to fluid nature of dealing with a pandemic. CICU staff are advised to remain vigilant for notification of changes in practice.
- CICU strategic goals:
    - Critically ill patients infected with COVID-19 must receive the best possible care without putting patients, visitors and healthcare workers at risk. All patients infected with COVID-19 must be identified immediately and isolated prior to causing unrecognised, unprotected exposure
- When caring for patients with suspected or confirmed COVID-19, all healthcare workers need to – prior to any patient interaction – assess the infectious risk posed to themselves and take appropriate precautions and with the correct use PPE to minimise that risk.
- Precautions applied for COVID-19 includes **contact** and **droplet** precautions with the addition of **airborne** for aerosol generating procedures (AGPs).
- The proper donning and doffing and disposal of contaminated PPE **are essential steps** in preventing inadvertent exposure to pathogens.
- NSW Health and SCHN websites are updated regularly and should be reviewed by staff
- Care of the Paediatric Intensive Care Patient http://webapps.schn.health.nsw.gov.au/epolicy/policy/3050/download forms the foundation of all patient care in CICU and must be read in conjunction with this guideline

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Background

An outbreak in 2019-2020 of the novel coronavirus, SARS-CoV-2, led to a pandemic of COVID-19 disease. Early data suggests that around 5% of patients with COVID-19 infection will require critical care although this number may be significantly lower in paediatric patients. The predominant reason for requiring critical care is respiratory failure. Children commonly present with URTI, cough, fever, co-infections and occasionally diarrhoea and vomiting.

The virus is transmissible via droplet and contact routes. These droplets are affected by gravity and may cause direct transmission from close contact or contribute to surface contamination where the virus may remain viable for hours to days. Some events can generate aerosols composed of smaller virus-containing particles suspended in the air. These airborne particles be inhaled, increasing the risk of transmission.

Infectious period

- The role of asymptomatic transmission is unclear, but if it occurs, is in the context of close and prolonged contact. The infectious period of COVID-19 remains unknown, however there is some evidence to support the occurrence of pre-symptomatic or asymptomatic transmission
- As a precautionary approach, cases are considered to be infectious 48 hours prior to onset of symptoms
- Cases are considered to pose a risk of onward transmission and require isolation until de-isolation criteria have been met

Care of critically ill patients requires a multidisciplinary, collaborative approach to patient care. In everyday clinical practice, most clinical decisions are made with attention only to the risks and benefits to a particular patient. However, during an outbreak, additional considerations regarding risk to staff and other patients may influence care decisions. This document outlines goals, tasks and actions required to reduce exposure to staff, other patients, and visitors to the virus and is subject to regular change - please check version and date of document at the time of reading.

Testing and Isolation Requirements

Symptoms of COVID-19 include fever, cough, sore throat and shortness of breath. Other reported symptoms include loss of smell, loss of taste, runny nose, muscle pain, joint pain, diarrhoea, nausea/vomiting and loss of appetite. In more severe cases, infection can cause pneumonia with severe acute respiratory distress.

NSW Health recommends that **anyone with respiratory symptoms or unexplained fever should be tested** for COVID-19. See SCHN Guideline: Testing and Specimen Selection for COVID-19 in Children.

- In CICU, A second test may be performed if initial results are negative and there remains a reasonable index of suspicion of infection. Decision for a second test will be made by CICU Consultant

- Lower respiratory tract samples should be collected for intubated and mechanically ventilated patients. Tracheal aspirates are considered to give a higher diagnostic yield than upper respiratory specimens
- Ensure specimen requests are ordered on eMR as urgent
- Ensure transport media tube is labelled prior to obtaining specimen. Once obtained, place in a **BLUE** biohazard bag inside the room. Place into a second **BLUE** biohazard bag outside the isolation room with the assistance of the isolation support nurse. This isolation support nurse should wear PPE during the double bagging process. This person is to apply label **URGENT CICU INPATIENT** on the outside of the **BLUE** biohazard bag and arrange its transfer to the laboratory.
- Notify the laboratory the sample is on the way
- Specimen should be taken directly to the laboratory by either portering or nursing staff It **must not** be sent by pneumatic automated laboratory delivery system ie "scud"
- Other respiratory viruses will be only tested on specific request *(e.g .request Respiratory panel 1 or Rapid Flu+RSV test where indicated)*.

For testing, isolation and de-isolation criteria please see Criteria For Testing For Covid-19 Admission Isolation Guide SCH Randwick

Preventative measures for COVID-19

- People most at risk of infection are those who are in close contact with a COVID-19 patient including potentially those who care for COVID-19 patients
- Preventative and mitigation measures are key
- Health care workers must receive education to protect themselves and prevent transmission in the healthcare setting, including correct application of standard and transmission-based precautions, correct selection of PPE and being trained in how to don, doff and disposal of PPE.
- PPE should be used based on the risk of exposure *(type of activity)* and the transmission dynamics of the pathogen *(contact, droplet or aerosol)*
- **Providing direct care for suspected or confirmed COVID-19 patients and performing aerosol generating procedures (AGPs) in these patients presents an increased risk of infection to healthcare workers.**
- Nursing infants and children in intensive care require time critical actions that limit opportunities whereby staff have time to adjust their level of PPE.
- Subsequently, when providing direct care to a patient with suspected or confirmed COVID-19, staff should use the following PPE:
    - Fluid resistant long-sleeved gown *(noted on external packaging)*
    - Gloves
    - Fit checked P2/N95 mask or powered air-purifying respirator

        - *Remove or replace it if the mask becomes hard to breathe through or no longer fitting correctly, becomes contaminated with bodily fluids, moist or loose*
    - eye protection *(goggles or face shield)*
    - hair cover
- Shoes that are impermeable to liquids
- Use of additional PPE may be undertaken at discretion of the individual
- The proper donning, doffing and disposal of contaminated PPE **are essential** in preventing inadvertent exposure to pathogens.
- The use of a spotter for all staff donning and doffing PPE using relevant PPE checklists must occur to provide additional protection for staff
- **Always perform hand hygiene if there is a risk of contamination between steps and immediately after removing gloves and when the sequence of PPE doffing has been completed**.

Airborne precautions & Aerosol Generating Procedures (AGPs)

- Positive pressure ventilation during non-invasive ventilation (NIV) or when using a face mask are high risk for generating aerosols.
- Many of these precipitating events can be prevented by neuromuscular blockade and avoiding concurrent AGPs so that, if performed correctly and without complications, they may not be aerosol generating.
- There are a range of procedures that are currently considered to be potentially infectious AGPs for COVID-19: This includes but not limited to: tracheal intubation, high flow nasal oxygen and non-invasive ventilation, oropharyngeal and tracheal suctioning
- Please see SCHN SOP: List of Aerosol-Generating Procedures
- If an AGP is required, the patient is to be placed in a negative pressure isolation room
- Limit people in the room
- Ensure that healthcare workers performing AGPs are wearing contact-droplet-airborne precautions:
- Any room which has had an AGP in it requires airborne precautions for a **minimum of 30 minutes** after conclusion of procedure
- Requirement is associated with risk of airborne particles and the time lapse required for enough air changes to remove potentially infectious material *(see Table 1 below).*
- Air changes/hour (ACH) of CICU Class N negative pressure isolation rooms:
    - Room 10 = 16 ACH (*smaller room to achieve comparable dilution)*
    - Room 11 = 23 ACH
    - Room 12 = 24 ACH

- Other staff can enter the Class N room before sufficient number of ACH occur but they must wear contact-droplet-airborne precautions

Table 1. ACH and time required for airborne-contaminant removal by efficiency

NUMBER OF AIR CHANGES PER HOUR AND TIME AND EFFICIENCY		
ACH	**Time (mins) required for removal 99% efficiency**	**Time (mins.) required for removal 99.9% efficiency**
2	138	207
4	69	104
6	46	69
8	35	52
10	28	41
12	23	35
15	18	28
20	14	21
50	6	8

The following procedures generate aerosolised droplets that spread widely and may increase the risk of transmission of respiratory viruses to healthcare workers

1 High flow nasal prong oxygen (HFNPO2)

- HFNPO2 still remains an appropriate therapy for some patients with respiratory failure from causes other than COVID-19 but
  - **When HFNPO2 is the ONLY appropriate therapy, it must be administered in a negative pressure or single room using airborne precautions**
  - If this is not possible, then efforts should be made to move the patient to a negative pressure or single room as soon as possible.
  - For review of patients in the ED or ward areas please see SCHN SOP: HFNC Therapy-SCHN Emergency Departments and wards.

2 Non-invasive ventilation (CPAP/BIPAP/BUBBLE CPAP)

- Non-invasive
- NIV should be used if clinically indicated, remembering that these patients may be co-infected with COVID-19 or seasonal influenza.
- **When NIV is the only appropriate therapy, administer in a negative pressure or single room using contact-droplet-airborne precautions**

3 Nebulizers

- Metered dose inhalers (MDIs) are the most effective way to deliver bronchodilators for asthma and are much safer
- MDIs should be used in conjunction with spacer devices, or MDI adapters in the case of patients requiring non-invasive (NIV) or invasive ventilatory support.
- There are limited circumstances where nebulisers are the only way to deliver aerosolised medications to patients. These include severe life threatening exacerbations of asthma, nebulised adrenaline for croup in children or aerosolised medications used in treatment of cystic fibrosis.

When nebulisers are the only appropriate therapy, administer in a negative pressure or single room using contact-droplet-airborne precautions.

Transfer of a Patient

- In principal, the movement of patients with suspected or confirmed COVID-19 should be limited with all efforts made to ensure the patient is initially admitted to the appropriate location.
- Patients may be transferred to CICU if critically unwell or deteriorating.
- During episodes of transport, potential breaches of infection control can occur.
- Staff who are involved with transfer of patients with suspected or confirmed COVID-19 must consider the following principles:
    - Early communication with transferring team and department
    - Early recognition of the deteriorating patient
    - Staff and bystander safety
    - Contingency plans for medical emergencies during transfer
    - Post-transfer decontamination
- Appropriate staff must accompany the child and adequate monitoring and equipment must be in progress and available at all times.
- Following process is to occur:
    - All staff involved in transferring the patient when an AGP may potentially occur should wear contact-droplet-airborne PPE. Anyone not wearing the appropriate PPE should not come within 1.5 metres of the patient.
    - HFNC is an AGP therefore if the patient is on HFNC the CICU consultant will determine if low flow nasal prongs is clinically appropriate during the transfer.
    - If the patient is intubated, consider muscle relaxant prior to transport to CICU
    - CICU to be advised if patient will require CICU bed or remain on current bed

- Before the patient is transferred, a member of staff who has not been in contact with the patient should clear the route leading to the lifts of equipment and people
- Prior to leaving CICU post-transfer decontamination of ED/ward bed and returning equipment is to be undertaken by ward/area transferring patient
- Please refer to the following SOPS:
- ED-CICU COVID-19 Handover Checklist
- CICU: Transport of ventilated COVID-19 patients to/from Medical Imaging

Admission of suspected or confirmed COVID-19 patient

- Suspected and confirmed COVID-19 patients should be treated in a Class N negative pressure single room.
- If Class N negative pressure single rooms are not available, risk stratification will be undertaken and CICU patient placement will escalate through the following stages:

  STAGE 1: risk stratification identifies the patient as LOW RISK of COVID-19,

  - a decision may be made to treat the patient in a Class S single room with clear demarcated areas for donning and doffing of PPE

  STAGE 2: once all Class N and Class S single rooms in CICU are exhausted, CICU will move to caring for patients

  - in an open cohorted area with one or more COVID-19 positive patients, the whole area requires airborne PPE precautions
  - moving non-respiratory CICU patients to a designated satellite area external to existing CICU footprint
- Consider nursing neonates in an enclosed isolette
- Record of staff members who enter the isolation room must be maintained. Prior to the patient arriving, a contact register on a clip board must be placed outside the room
- Posters with instructions for 'donning' and 'doffing' PPE are applied to wall inside and outside of the room

Equipment and preparation for admission

- Viral filters are available for use in CICU for these patients for positioning between resuscitation mask and resuscitation bag
- All infusions should be prepared prior to patient's arrival where possible
- When the patient arrives the NUM/TL **must be informed** and receiving nurse and doctor must be present ready to receive the patient.
- **Entry to the room is to be minimised to essential personnel only. Clinical handover will occur in the room and over the 2-way radio to the extended team.**

Parental Communication

SCHN provides guidance regarding visitation of families and other visitors. This advice is updated in response to the level of risk of COVID-19 in the community.

All visitors are required to register their details using the QR code at the entrance to CICU.

Every parent/caregiver MUST be asked essential screening questions **EVERY SHIFT**

- Do you have a fever or a cold or flu-like illness? **ie symptomatic**
- Have you returned from overseas in the last 14 days?
- In the last 14 days, have you been in contact with anyone who is known to have COVID-19?

- If they answer **YES** to **ANY** of the above questions, they must leave with advice they should be tested for SARS-CoV-2 and self-isolate
  - *If their child is extremely unwell, exceptions may be made to this with planning and discussion with the CICU Consultant and NUM/TL*
- If parents/caregiver are permitted to visit they will be allowed to have one period of visitation per day, as discussed with the NUM/TL. They must be advised to wear a gown/apron, surgical mask and goggles.
- They are not permitted to use any communal spaces e.g. kitchen.
- If parents/caregivers are unable to visit their child as they are self-isolating or unwell, efforts to communicate with the family by telephone are to be made on a daily basis as a minimum

Intubation of a suspected or confirmed COVID-19 patient

- Manual ventilation should be undertaken with minimal tidal volumes and a two person technique to minimise leak and avoid aerosolisation
- Intubation of a patient with COVID-19 is particularly high risk to staff members and should only be undertaken by the most skilled available clinicians.
- Intubation must be undertaken in a Class N negative pressure single room with contact-droplet-airborne precautions.
- Intubation equipment is stored in the CICU COVID-19 airway trolleys. Equipment includes McGrath videolaryngoscope and disposable blades.
- The CICU COVID-19 trolley should be stored outside the COVID zone, with the appropriate equipment for an intubation to be prepared on a trolley and taken into patient room by the intubation team.

- Detailed documents regarding intubation have been developed in collaboration between Anaesthetics, CICU and ED and can be found on the SCHN Standard Operating Procedures Intranet Page and L Drive:

  SCH Critical Care COVID-19 INTUBATION CHECKLIST

  SCH Critical Care Teams COVID-19 Intubation Sequence Card

  SCH Critical Care Teams COVID-19 Intubation Room Layout

  CICU COVID-19 Intubation Drug Tray

Ventilated patient with suspected or confirmed COVID-19

- Refer to Ventilated Patient: Patient Care in CICU Clinical Practice Guideline http://webapps.schn.health.nsw.gov.au/epolicy/policy/3059/download for foundation care
- Additional strategies for patient care include:
  - Oral cuffed endotracheal tubes will be the standard and not changed to nasal
  - ETT cuff must be inflated at ALL times
  - Inline suction to be used for all patients avoiding loss of PEEP and atelectasis
  - When disconnection required *e.g. transfer from transport ventilator* and disable ventilator , the following steps should occur:
    1) ETT cuff MUST be inflated fully
    2) Turn ventilator to standby (or if manual ventilation turn off oxygen)
    3) Clamp ETT
    4) Connect patient to ventilator
    5) Unclamp ETT and start ventilation
  - HFOV should not be used as HME filters cannot be placed on expiratory ports
  - Deep sedation and muscle relaxation may be required to prevent patient ventilator asynchrony and resultant lung injury and to prevent patient from coughing
  - CICU Consultant to determine when neuromuscular blockade infusion should be started and ceased.
  - Physiotherapy will be evaluated by the consultant on a case-by-case basis and provided when there are clinical indicators so that physiotherapy staff exposure to patients is minimised
  - Ventilation tubing change frequency will be determined by the Consultant

X-Ray

- Mobile x-rays should only be ordered when necessary and not as a routine request
- See guideline: Mobile X-ray in Isolation Zone-CICU-SCH

Extubation in suspected or confirmed COVID-19 patients

- SARS-CoV-2 results will be considered by CICU Consultants prior to extubation and in determining post-extubation respiratory support
- Extubation should follow same contact-droplet-airborne precautions and PPE as the process for intubation to avoid aerosolisation and minimise staff exposure
- Extubations should be performed by an experienced senior clinician
- Steps to consider:
    a. Minimise staff in the room
    b. Aim to minimise coughing
    c. Pre-oxygenation prior to extubation
    d. Careful suction of ETT with closed system and oral suction with yankauer suction
    e. Extubate to face mask and maintain seal initially until able to breathe on room air or low flow oxygen via Hudson mask or nasal prongs.
    f. After airway management dispose of single use equipment or follow below process for non-disposable equipment

Caring for a patient with a tracheostomy

- If patient has tracheostomy and ventilated via home ventilator, this ventilator is not suitable for use as single limb circuit is vented and aerosol generating
- Discuss with CICU Consultant need to change to dual limbed Servo U ventilator
- If uncuffed tracheostomy tube present, discuss with CICU Consultant, Tracheostomy CNC and ENT Consultant whether change to a cuffed tracheostomy to minimise leak is appropriate based on individual patient characteristics.
- Specific documents regarding care of patient with a tracheostomy with suspected or confirmed COVID-19 in CICU are available on the L Drive

    Care of a Patient with a Tracheostomy requiring Ventilation

    Care of a non- ventilated tracheostomy patient

    COVID-19 Emergency Response Algorithm Tracheostomy Non-Vent

    COVID-19 Emergency Response Algorithm Tracheostomy Vent

CERS Response for suspected or confirmed COVID-19

- The ACCESS nurse must check the emergency resus bag each shift to ensure there are PPE packs, viral filters, and the McGrath videolaryngoscope in the event of a code blue outside of CICU
- Documentation in eMR should occur for all CICU reviews and attendance at code blues
- Please see documents on the L drive and SCHN Standard Operating Procedures page regarding COVID-19 CERS response:
- L:\CICU_Nursing\COVID-19\5. CERS Code Blue documents

Maternal/Newborn Information

- In light of the current evidence, the well-recognised benefits of breastmilk outweigh any potential risks of transmission of the virus through breastmilk
- Mothers with suspected or confirmed COVID-19 who are expressing should use surgical facemask and perform hand hygiene before and after contact with all equipment
- Strict hygiene by staff is required if handling expressed breastmilk.
- Please refer to the following document regarding management and handling of expressed breastmilk: *NSW Health: Special precautions for management of expressed breast milk (EBM) of mothers with suspected, probable or confirmed COVID-19*

Reprocessing of Non-disposable Equipment

- Where possible, disposable equipment should be utilised. Immediately dispose of single use equipment in clinical waste
- If non-disposable equipment has been utilised, the following is to occur:
    - Wipe down reusable equipment with Clinell wipe
    - Place in plastic zip-lock bag in patient's room
    - Place in second plastic bag outside patients room and place in container in dirty pan room from where equipment will be sent to CSSD

Death of a suspected or confirmed COVID-19 patient

- Staff handling deceased patients should continue to wear PPE. If drains and lines need to be removed then contact-droplet-airborne precautions must be taken.
- Dignity of the deceased, their cultural and religious traditions and their families should be respected and protected. Each situation will be managed on a case-by-case basis,

balancing the rights of the family, the need to investigate the cause of death, and the risks of exposure to infection.

- Family viewing of the deceased patient should be co-ordinated by social work in consultation with ID consultant
- In cases where NSW Police attend CICU, they will perform a Risk Assessment if they suspect COVID-19 infection of a deceased patient.
- Management of deceased bodies should following procedure outlined in Death of a Child document http://webapps.schn.health.nsw.gov.au/epolicy/policy/4056/download with the following adjustments:
    - Body to be placed in **YELLOW** body bags in CICU not in the mortuary
    - Body must be double (2) bagged using **TWO YELLOW** body bags
    - Body bags should be clearly and permanently labelled as **"COVID-19 – Handle with care"**
    - Place the patient identification labels on two mortuary cards
        i. one labelled card is taped onto the body bag
        ii. other card is to be stuck on the refrigerator door to alert Mortuary staff to the presence of a body noting **"COVID-19 – Handle with care"**
    - Outer surface of the body bag should be decontaminated *(see environmental decontamination)* immediately before the body bag leaves the isolation room
    - Trolley carrying the body must be disinfected prior to leaving the isolation room, including the wheels, with single step disinfectant wipe
    - ~~o~~ Staff are to wear PPE at all times, including when transferring body to the mortuary

Handling of paper health records

- The risk of paper health record contamination and subsequent exposure to COVID-19 in the absence of a spill *(or similar)* is thought to be unlikely and considered extremely low.
- The available evidence does not support the idea of holding notes and this is an unnecessary step and may increase the risk of separating notes from where they may be needed.
- Local processes within CICU implemented to manage these health records and the assist in reducing the risk of cross contamination of these items include:
    - Hand Hygiene before/after contact with notes (patients and HWs)
    - Keeping desk areas clean and tidy – cleaning of work stations and work sites
    - Use of electronic notes where possible
    - Zone modelling to reduce notes going directly in to patient care zone

Environmental Decontamination

- Minimise equipment and items in the patient areas
- Dedicated or disposable equipment must be used for environmental decontamination
- Reusable equipment such as X-ray and Ultrasound machines must be decontaminated after use with single step disinfectant wipe
- Cleaning and decontamination should only be performed by staff trained in use of PPE
- Nursing staff allocated to the patient should undertake the cleaning, where possible, to limit the exposure of extra staff
- To ensure appropriate use of PPE and that an adequate level of cleaning is undertaken, it is strongly recommended that cleaning of the isolation room is undertaken separately to the cleaning of other clinical areas
- A combined cleaning and disinfection procedure should be used to decontaminate the environment: (either 2 step detergent clean, followed by disinfectant; or 2-in-1 step using a product that has both cleaning and disinfectant properties)
    - Patient room should be cleaned daily AND following AGPs or other potential contamination
    - Cleaners should observe contact and droplet precautions
    - Frequently touched surfaces *(such as door handles, bedrails, tabletops, light switches)* in the patient's room should be cleaned daily
    - Terminal cleaning of all surfaces in the room *(as above plus floor, ceiling, walls, blinds)* should be performed after the patient is discharged from room
    - Curtains – change after transfer/discharge of confirmed case
    - Door should be closed at completion of clean and left for 30 minutes prior to next use.

Handling of Linen

- All linen is treated as potentially infectious and processes in place are currently adequate
- Handle with minimum agitation to avoid contamination of air, surfaces and people *(eg roll up)*
- Visibly soiled linen should be placed in linen skip that has been lined with a dissolvable linen bag

Waste Management

- Waste to be disposed of in normal clinical waste
- All non-clinical waste is disposed of into general waste stream

APPENDIX 1

A wide-range of documents complement this SOP and are available to CICU clinicians on the L drive.

1. COVID Nursing Roles and Checklists
2. Procedures – x-ray
3. Personal Protective Equipment
4. Transfer of Patients
5. CERS Code Blue Documents
6. Intubation Documents
7. Tracheostomy Procedures
8. COVID-19 Suspected or Confirmed Patient Care in CICU Clinical Practice Guideline
9. Visitor letters
10. COVID Trolley Checklists

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Revision History

Version (date)	Approved by	Amendment notes *(summary of what was changed)*
19/5/20	M McCaskill	N/A – new SOP published on the COVID-19 CICU SOP intranet page
26/11/2020	M McCaskill	Updated to reflect current NSW Health Guidance