NSW critical care management of neonatal patients

A COVID-19 response for neonatal intensive care units

This document provides guidance to managers and clinicians for the critical care management of neonates and babies requiring neonatal care during the COVID-19 pandemic.

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NSW GOVERNMENT

AGENCY FOR CLINICAL INNOVATION

Background

The current state of COVID-19 in Australia remains at a critical point. Both federal and state governments have implemented strategies to help stop the spread of COVID-19. Neonates appear to be less commonly affected by COVID-19 than adults, however planning and preparedness for a neonatal intensive care unit (NICU) response to the management of neonates during the pandemic is essential.

It is expected that critical care services will experience a significant increase in demand for personnel, specialised equipment and beds in the event of a significant increase in presentations to our hospitals.

New South Wales (NSW) Health will continue to work with critical care service providers to monitor and proactively manage demand in intensive care units (ICUs), close observation units (COUs), paediatric intensive care units (PICUs), NICUs, special care nurseries (SCN) and medical retrieval services.

High-level principles

This document aligns to the principles identified in the strategic health plan for children, young people and families 2014–24.[1]

These principles are:

- caring for women and babies
- keeping children and young people healthy
- addressing risk and harm
- early intervention
- right care, right place, right time.

Purpose

The purpose of this document is to provide guidance to managers and clinicians for the critical care management of newborn babies requiring neonatal care during the COVID-19 pandemic.

The goal is to maintain existing best practices for managing conditions that require NICU admission, while alerting clinicians and managers to the additional complexities and changes to practice that will be necessary, while working in the already established 'Tiered Maternity and Neonatal Networks'.[8] Acknowledging that while this advice is for neonates, mothers and babies are seen to be inextricably linked and will need to be considered.[8]

This document also aims to identify alternate strategies that should be considered during the COVID-19 pandemic, when existing resources are nearing or are at capacity.

This document aligns to existing NSW Health documents and is designed to complement these, while providing specific COVID-19 advice for NICUs at level 5 and level 6 neonatal services.[2,3]

Neonatal services in NSW[8]

Neonatal services in NSW provide special care, high dependency and intensive care beds across a variety of service levels and locations. This may be in a SCN looking after lower acuity babies, up to a dedicated ICU (NICU), which can provide extensive critical care services and retrieval for babies across the state.

NICUs are part of level 5 and level 6 neonatal services as defined by NSW role delineation.[9]

The level 6 neonatal services provide services for:

- all aspects of medical care
- specialist neonatal and neonatal surgical services to all of NSW
- care for complex congenital and metabolic diseases of the newborn
- support for women with pregnancies with known fetal abnormality requiring consultation, treatment or surgery immediately following birth.

These services are available at John Hunter Children's Hospital (JHCH), The Children's Hospital Westmead (CHW) and Sydney Children's Hospital Randwick (SCH).

Level 5 neonatal services provide:

- comprehensive neonatal care, excluding complex surgical, cardiac and metabolic services
- intensive care for critically ill newborns (e.g. ventilation, total parenteral nutrition, exchange transfusion)
- full range of respiratory support
- neonatal care for babies across NSW.

These services are available at Liverpool, Nepean, Royal North Shore, Royal Hospital for Women, Westmead and Royal Prince Alfred.

While there are no NICUs located in private hospitals in NSW, there are special care nurseries attached to private hospitals.

Having oversight of the locations and capacity of these beds will be required if NICU capacity is reduced in public hospitals.

It is recommended that communication channels should be established and formalised between private and public hospital units for potential capacity.

Current NICU bed capacity

The current NICU capacity in NSW is identified below.

Table 1: NSW NICU capacity

Hospital	Purchased beds
Level 5 and 6 neonatal services	
CHW	23
SCH	4
JHCH	19
Liverpool	14
Nepean	12
Royal North Shore	16
Royal Hospital for Women	16
Royal Prince Alfred	22
Westmead	24

A local assessment of the availability of isolation and negative pressure rooms will be required.

There is an established hub and spoke model for public hospitals that facilitate the management of babies requiring high level NICU care and the return transfer to special care nurseries.

While tertiary units will likely be well staffed and equipped for the pandemic, consideration will need to be given to supporting lower level units during times of increased activity.[4]

Managing capacity during the COVID-19 pandemic

Currently there is no evidence to suggest there will be an increase in the demand for NICU or SCN beds for the management of COVID-19 positive babies.

Communication and coordination

During a pandemic, the established communication and coordination process should be utilised to coordinate the safe care of neonates and their mothers.

Facilities should have local processes for the consultation, escalation and transfer that is reflective of their service capabilities, which are already established.[8] Level 5 and level 6 NICUs should facilitate a communication and coordination role for the state to ensure effective use of vital resources and meet the COVID-19 demand with an effective distribution of burden on units, while maintaining service delivery.

Managing NICU bed status

All patient movements at NICUs can be tracked by the patient flow portal (PFP).

Staff must update the PFP at least every four hours to ensure accurate information on current bed status is available across NSW.

Specific information requiring frequent updates include:

- facility and ward Short Term Escalation Plan (STEP) level colour
- bed availability by nursing dependency (Nur Dep)
- respiratory support status (Resp)
- ventilation vs non-ventilation
- Bi-PAP/Bubble CPAP
- the name and contact details of the NICU consultant on duty.

Increasing intensive care bed capacity for neonatal patients

Options for increasing NICU capacity is limited and the most logical option is to identify surge capacity.

The following should also be considered as options for creating additional NICU capacity, if appropriate.

- Optimising NICU discharge planning and transfer.
- Expediting the introduction of the NETS nurse-led return transport service.
- Consider appropriate back transfers to referring hospitals to create capacity.
- Consider the role postnatal wards may have with accompanied staffing requirements for maternity wards in the management of some babies e.g. jaundice and glucose management. This would also reduce the need to transfer some babies to different facilities.

Triaging NICU admissions

During a pandemic-related surge it will be important that consistent decisions are made regarding both admission to NICU and continuing care when a meaningful recovery is unlikely, with the use of end of life plans where appropriate. It is important that the triage principles to maximise access to NICU are used for all potential admissions, not just infection-related admissions.

The ANZICS COVID-19 Guidelines recommend that admission to intensive care should reflect routine practice, be open and transparent, and incorporate a shared decision-making model, which includes the treating intensivist, other clinicians and the family. Similar principles should be considered for NICUs if overwhelmed in a pandemic situation.[11]

Telehealth

Telehealth should be considered to increase ICU capacity across NSW. Effective telehealth models of care could reduce patient transfers, keep neonates closer to home longer, and support medical, nursing and allied health staff in providing critical care to neonates who are assessed clinically appropriate for this model.

Telehealth can be used to:

- support low level ventilation in non-NICU units
- support 'surge models' where extra staff are deployed
- support rural and regional facilities
- facilitating early return transfer of neonates
- support close observation units.[9]

Rural and regional considerations

Rural and regional facilities have limited ventilation capacity and capability. With additional support, neonates could be managed in these facilities for a period of time. Any extended period would require significant workforce and equipment support.

These hospitals will need to develop operational plans as part of the Tiered Perinatal network, that specify the STEPs required to create capacity at higher level facilities. This includes staffing, location, equipment and procedures and guidelines.[8]

Telehealth could play an important role in preparing and supporting rural and regional sites.

Equipment

Facilities providing care to neonates must be aware of the availability of the following resources, to inform their local critical care surge response:

- equipment and consumables required to set up and sustain a typical NICU/SCN bed space
- standard NICU ventilators
- transport ventilators
- portable monitoring devices including portable oxygen saturation monitors
- personal protective equipment (PPE).[10]

Ventilator capacity

All SCN and NICUs will need to be aware of the number of ventilators that are available in their service, including the number of transport ventilators and the types of patients the ventilators are capable of ventilating, maintenance cycles and availability of associated equipment and consumables.

Newborn and Paediatric Emergency Transport Service (NETS)

NETS is the state-wide emergency service for medical retrieval of critically ill newborns, infants and children in NSW.

NETS can assist if there is high demand by:

- supporting existing services
- supporting existing models of care
- using telehealth to provide support to manage the child in the local hospital or closer to home.

NETS should also review their current equipment, including incubators that would be required for managing an increase in demand for its services.

Other considerations

It will also be important to understand unit configurations and variables for specific clinical management eventualities.

Consideration should be given to:

- the number of negative pressure rooms and ensuring they are functioning properly
- the number of single rooms available for patient isolation
- capacity for rooming in and utilising family rooms if appropriate commissioning steps are undertaken (medical gases, isolated and essential power, monitoring, etc).

Managing babies with respiratory problems

The NSW Ministry of Health has provided advice on the management of newborn babies born to women with suspected or confirmed cases of COVID-19.[5, 13]

A baby born to a woman with suspected or confirmed COVID-19 is considered a close contact of the woman and will require precautions in the acute healthcare setting. This does not necessarily include separation and should be monitored on a case-by-case basis. The Ministry encourages a multidisciplinary approach to the management of babies that fall into this category.

If resuscitation of the baby is required, the team involved in the resuscitation must comprise of only the essential team managing the resuscitation, wearing appropriate PPE. Only essential equipment should be taken into the room, while other equipment should made available outside the room, and cleaned as appropriate.

Special care nurseries

SCNs should follow the Guidance for neonatal services.

If babies require respiratory support, they should be managed in a single room or in a closed crib, two metres between babies. If transfer is required, NETS should be contacted.

Emergency department management

Emergency departments will be required to manage babies with respiratory problems in line with existing COVID-19 protocols.

Other considerations for emergency departments will be the safe transportation of the neonates and babies through the hospital to the required neonatal or paediatric ward.

Transportation protocols will need to be developed for:

- direct presentation to the ED
- transfers to other wards including NICU or SCN.

Other considerations for emergency departments will be in relation to:

- prompt access to ICU consultation
- intubation procedures
- managing neonates while COVID-19 test results are pending
- caring for a ventilated patient while waiting for a NICU bed.

Currently, the time for returning results for COVID-19 tests varies. The requirement to expedite COVID-19 tests should be identified as urgent and communicated to the testing laboratory.

Neonates should be assessed and screened in line with the latest national recommendations for COVID-19. This includes:

- clinical history
- contact
- travel history.

If the patient is identified as 'at risk', they should be isolated and tested for COVID-19 until results confirm otherwise.

NETS should be informed of any changes in the physical access to hospitals due to COVID-19 strategies.

Managing a newborn baby requiring admission to a neonatal unit

This section refers to newborn babies who require admission to a neonatal unit from the birth environment or postnatal ward.

A suspected or confirmed COVID-19 maternal infection is not itself an indication for the baby to be admitted to a neonatal unit.[6]

Local indications for admission to a NICU or SCN should be followed.

It is recommended that babies are cared for in closed incubators (humidicrib) and, when available, in a single room.

Where a single or separate room is not available, neonatal units should identify three separate areas to triage newborn infants.

1. Proven neonatal COVID-19.
2. Suspected neonatal COVID-19 (i.e. pending test results).
3. No risk or suspicion of COVID-19.

If necessary, areas 1 and 2 could be combined with physical distancing. A separate area is required for 3.

Mothers who have suspected or confirmed COVID-19 are not able to visit the neonatal unit.[5]

Where possible, mothers and babies will be kept together, especially in the immediate postnatal stage.

Cross border considerations

There are existing cross border arrangements and formal agreements for the management of neonates requiring access to a NICU.

For NSW these include:

- Southern and Murrumbidgee Local Health Districts (LHDs) with Canberra
- Northern NSW LHD with Queensland
- Far West LHD with South Australia.

The processes for activating these pathways should be reviewed to ensure there are minimal barriers to accessing the right people to initiate the transfers.[12]

Managing carers and families

There are multiple scenarios for consideration in relation to parents, carers and families in the NICU.

Each unit will have policies that cover these scenarios but they should be reviewed to ensure they align with current COVID-19 advice.

Information for parents, carers and visitors

Information for families must align with current COVID-19 information.

The information should cover confirmed cases, suspected cases and close contacts.

Information should be displayed in a prominent place and available in multiple languages.

Restricting access to NICUs

Neonatal units should be actively screening all visitors in addition to general facility screening (front entrance). This should include, as per NSW Health advice, anyone with flu-like symptoms, recent travel (including domestic travel due to community transmission), and close contact with a COVID-19 case.

Restrictions may include:

- strictly no visitors other than parents in the NICU

- no children, including siblings, allowed in the NICU

- if a mother or father is tested positive COVID-19, then no visiting can occur for either parent

- no visiting from parents who are considered close contacts of a COVID-19 positive person or any parent that is requested to quarantine.

Reinforcing current best practice

NICU/SCN units are also encouraged to review current practice and consider how they can further eliminate or reduce opportunities for transmission.

Examples include advising parents or visitors to:

- wash hands when entering and leaving the NICU, before and after eating and after going to the toilet. Use alcohol hand rub when leaving the unit

- wash hands before touching their baby, breast pumps or bottles

- follow recommendations for breast pump cleaning after each use

- consider asking someone who is well to feed expressed breast milk to the baby if the mother or parent is unwell or unable

- keep mobile phone use to a minimum. Mobile phones should be cleaned and placed in a sealed bag when entering NICU/SCN.

All non-essential people should not enter NICU or SCN.

Workforce management

Surge planning

Planning for surge capacity staffing will need to cover at least the next 72 hours and be reassessed daily, with monitoring for staff fatigue and stress, and include hospital or district and network strategies to mitigate these.

A team oriented approach should be considered during the pandemic if less experienced staff are assigned in the NICU to support skilled staff.[7]

Establish teams

If a unit has COVID-19 positive neonates or parent, NICUs and SCN should consider establishing two nursing teams to minimise cross infection during a shift. Typically, these teams are known as Team A and Team B.

The aim is to prevent teams from coming into contact with each other during the shift and while on breaks. Consideration will also need to be given to how staff access equipment, medication and other supplies so that the teams do not cross paths. Some medical teams have divided themselves into teams that will not mix at all during the pandemic.

Deployment of NICU staff

Where staff are required to be deployed to other wards due to low occupancy, the following needs to be considered.

- To make use of expertise and experience where they are needed most.

- Maintain appropriate staffing levels for current occupancy.

- Reinforce correct PPE procedures to minimise the exposure risk.

- Inform staff of any changes in policy, workflow or other relevant information.

- Risk assessment should be undertaken when staff deployment is being considered. This should be based on the individual staff experience and skill.

- During a pandemic, hospitals and local health districts will need to provide endorsed policies and guidelines for staff who may be required to work outside the normal minimum workforce standards and guidelines.

- Fast-track orientation program is provided, using just in time education and refresher training in the early phases of the pandemic planning.

- Deployed nurses who care for COVID-19 positive patients would not be permitted to return to the NICU at any point during that shift.

- Consideration will need to be given to where staff are deployed to based on their clinical experience and qualifications.

- Alternatives to deployment might include, commencing education and upskilling of staff so if there is an influx of NICU or SCN newborns, there will be a skilled workforce to care for them.

Increasing NICU/SCN staff capacity during a surge period

While there is currently no evidence to suggest there will be an increase in the demand for NICU or SCN beds during the COVID-19 pandemic, level 5 and 6 services should consider planning for a scenario of increased demand.

The following options should be considered to maintain and increase the access to front line staff during acute times of need.

- Coordination with adult ICU and paediatric ICU staff that may have neonatal or paediatric experience.
- Recalling clinicians on secondment in other areas back to their home unit.
- Pooling staff with other units.
- Prepare a register of staff with critical care experience, who are not currently working in a critical care unit and place them on a standby list.
- Extending the visas for clinical staff nearing the end of their permitted working time.

Alternative workforce models that may increase capacity

It is worthwhile exploring a broad range of workforce models to increase NICU and SCN bed capacity. While there are limited opportunities to bring on 'unskilled' staff, the following are worthy of consideration.

- What is the nursing dependency now and what could it look like?
- Is there an opportunity for other health disciplines, e.g. student midwives, medical students, allied health?
- What additional roles could parents undertake?
- Are there staff in your hospital that are not currently working in the NICU or SCN that could be seconded into a NICU or SCN?

- Consider midwives on the birthing unit and postnatal ward maybe utilised.
- Consider midwives on the birthing unit and utilising the postnatal ward.
- Arrangements can be made for cross credentialing for staff within a local health district during times of peak demand, which will be supported by the NSW Ministry of Health.

Workforce training and upskilling

There will be a need to review and provide additional training to clinical staff managing COVID-19 infected patients and all other staff who will be near COVID-19 positive patients.

Each facility will have some unique training requirements but the following would be considered essential skills where clinicians can demonstrate proficiency:

- donning and doffing (the use and fitting of PPE including gowns, gloves, N95 and P2 masks fit testing and checking)
- intubation*
- extubation*
- bronchoscopy*
- high flow nasal oxygen use
- non-invasive ventilation
- procedures on distressed children
- CPR
- management of a ventilated patient*
- correct hand hygiene techniques
- equipment use and maintenance
- medication management.

The Clinical Excellence Commission (CEC) and the Health Education and Training Institute (HETI) have resources to assist with staff education. These resources provide general advice, however there will be a requirement for units to provide unit specific material.

It is important to recognise that simulated training is essential for minimising infection and protecting staff.

* must only be undertaken within scope of practice and following appropriate training and credentialing

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Glossary

CHW	The Children's Hospital at Westmead
COU	Close observation units
CPAP	Continuous Positive Airway Pressure
ETT	EndoTracheal Tube
ETCO$_2$	End Tidal CO$_2$
ICU	Intensive care unit
JHCH	John Hunter Children's Hospital
LFNC	Low Flow Nasal Cannula
LHD	Local health district
MoH	Ministry of Health
NICU	Neonatal intensive care unit
NETS	Newborn and Paediatric Emergency Transport Service
NSW	New South Wales
PICU	Paediatric intensive care unit
PFP	Patient flow portal
RHW	Royal Hospital for Women
RNSH	Royal North Shore Hospital
SCN	Special care nurseries
SCU	Special care unit

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