

Supporting preparedness and response for the provision of intensive care during the COVID-19 pandemic

This document provides the framework to support the provision of intensive care services to adult patients during the COVID-19 pandemic. It should be used to inform local policies and procedures, which should be current and reviewed regularly.

The procedures described in this document apply to intensive care units (ICUs) within NSW public hospitals.

Purpose

This guide provides direction to NSW local health districts (LHDs) for the delivery of intensive care services during the COVID-19 pandemic. This document supports the [NSW Health Influenza Pandemic Plan](#), the [NSW Human Influenza Pandemic Plan](#) and the [NSW Health Services Functional Area Supporting Plan](#) (NSW HEALTHPLAN).¹⁻³

Conservative models of a large-scale influenza pandemic predict more than 170% utilisation of intensive care resources.⁴ Each facility should have its own plan to ensure intensive care services are able to surge effectively, and that equitable access is maintained.

ICUs have a key role to play in the organised response to COVID-19 in NSW. This document outlines the required response regarding:

- communication and coordination
- increasing ICU bed capacity and workforce
- optimising health infrastructure and logistics
- employing an ICU Pandemic Short Term Escalation Plan
- resource allocation of critical care services.

Governance

Use of this guide and other policy documents will be underpinned by local factors. These include location and demographics; and service factors, such as leadership, governance, resources, policies and procedures.

This document is an update to the NSW adult intensive care services pandemic response planning document (last reviewed on 1 July 2021).⁵

Methodology

This guide is based on current evidence. It is supported by expert clinical consensus of a multidisciplinary team. It was developed in consultation with senior clinicians from the Agency for Clinical Innovation's COVID-19 communities of practice (respiratory, emergency), the Clinical Excellence Commission (CEC) and the NSW Ministry of Health (Ministry).

Delta variant of concern

There are currently four variants of concern, as determined by the World Health Organization: Alpha, Beta, Gamma and Delta. Australia is currently detecting the Delta variant. The Delta variant has increased transmissibility rates, severity, vaccine resistance and hospitalisation rates, compared with Alpha.⁶

Delta is also more common in younger people, compared with previous variants. Risk of hospital admission is approximately doubled in those with the Delta variant when compared with Alpha. This is particularly increased in those with five or more relevant comorbidities. This is impacting on the provision of intensive care services in NSW.^{6,7}

Communication and coordination

A framework with clearly defined lines of communication will ensure the timely and accurate transfer of information and communication between intensive care service providers and pandemic response authorities. This should be used to support appropriate decision making and governance.

Key stakeholders have the following roles and responsibilities for planning the adult intensive care services pandemic response in NSW.

Role and responsibilities related to intensive care services³

NSW Ministry of Health, NSW Agency for Clinical Innovation, local health districts (LHDs) and intensive care units within NSW public hospitals have defined roles and responsibilities for adult intensive care services pandemic response planning.

Organisation	Roles and responsibilities
Ministry of Health	<ul style="list-style-type: none"> • Provide overarching governance, coordination and management of the state's critical care services. This includes (but is not limited to) coordination and planning of a system-wide response to support local services to deliver care, and appropriate resource allocation and distribution. • Provide input into the development and delivery of key health information messages for health services and the public during health emergencies. • Lead the NSW COVID-19 Clinical Council, which provides a peak governance body for clinician engagement. The Council provides expert advice and guidance to the system on matters that require a statewide or system response. • Coordinate the national health sector response to a pandemic, including the technical aspects adopted by NSW for national consistency.
Local health districts	<ul style="list-style-type: none"> • Coordinate and manage the delivery of care to meet local requirements. • Prepare and maintain arrangements for surge staff capacity. • Coordinate targeted local communication and support and communication of statewide messages. • Consistently coordinate and communicate LHD pandemic plans.
Intensive care units	<ul style="list-style-type: none"> • Maintain an up-to-date local pandemic response plan. • Maintain communication with key stakeholders (hospital management and executive, LHDs, ACI Intensive Care NSW and the NSW Ministry of Health), including updating the Patient Flow Portal (PFP). • Maintain an updated list of COVID vaccination status among staff. • Maintain a list of staff available to be deployed to the ICU, if required. • Maintain educational resources for staff related to managing COVID-positive patients; and provide LHD staff with educational resources and opportunities to upskill. • Ensure all staff have been fit-tested for personal protective equipment and maintain a record of this. • Inform staff on changes to Public Health Orders; system-wide alerts; information related to intensive care therapies in COVID-19; and vaccination updates. • Promote and encourage staff wellbeing by facilitating open communication and access to the Employee Assistance Program (EAP).
Intensive Care NSW (ICNSW)	<ul style="list-style-type: none"> • In March 2020, the Intensive Care Community of Practice (ICCoP) was established; coordinated by the ACI's Intensive Care NSW clinical network. • The ICCoP is a group of multidisciplinary intensive clinicians and stakeholders, who meet via teleconference on a weekly basis. The group is chaired by the ACI ICNSW Clinical Director and a paediatric medical lead. • The aim of the ICCoP is to provide an update on the pandemic and statewide status of ICUs. It is also an opportunity for clinicians to share ideas, strategies, local solutions and concerns with respect to the pandemic. • Issues raised at the ICCoP are escalated to the appropriate branch of the Ministry of Health for consideration and actioned, where required. Information is then communicated from the Ministry back to clinicians via the ICCoP.

Monitoring ICU activity and capacity

Information within the PFP should be updated by ICU staff at a minimum of every four hours, or as changes occur. This ensures it accurately reflects the situation within the ICU and enables site and LHD executives, and the Ministry to understand current capacity and resourcing in real time. The PFP should include the following information:

- ICU Pandemic (STEP) level
- Bed availability, by Nursing Dependency (Nur Dep)
- COVID-19 beds
- Negative pressure rooms in use
- Respiratory support status (Resp)
- Dialysis status
- Name and contact details of ICU consultant on duty.⁸

Intensive care surge planning, escalation and de-escalation

During the pandemic, the incident controller will request all NSW ICUs to use the ICU Pandemic STEP and update the level as changes occur (or at least every four hours) in the PFP.

The purpose of the NSW Pandemic ICU STEP is to provide a framework that defines the impact of the pandemic on daily operations and the triggers to move to the next escalation phase. It enables facilities to employ strategies to manage critically ill patients during each phase of the pandemic.

Principles of the escalation plan

- Ensure consistency in the application of the STEP across NSW during the pandemic.
- Communicate facility escalation phases to the State Health Emergency Operations Centre (SHEOC).
- Ensure LHD critical care networking arrangements are confirmed and reinforced.
- Facilitate the escalation of additional resource requirements through LHD channels (LHDs are to escalate to SHEOC if they are unable to manage the requests).
- Ensure resources are distributed efficiently by the SHEOC in response to facility demand. The incident controller will advise when ICUs are to stop using the ICU Pandemic STEP.

Increasing ICU bed capacity

Additional ICU bed capacity will be achieved by enacting local pandemic/disaster plans and considering:

- opening additional beds in existing non-commissioned physical intensive care bed spaces
- progressively converting appropriately monitored beds to intensive care; for example, coronary care units (CCUs), operating theatre (OT) recovery, close observation units (COUs)
- deferring elective surgery requiring post-operative ICU care
- using available private hospital ICU capacity
- liaising with the Ministry NSW ICU Flow Coordinator role to assist and support in adult ICU bed finding for all non-time urgent transfers of adult patients, seven days a week*
- reviewing the need for accepting referral of patients for ICU from other facilities within NSW
- suspending elective referrals of patients requiring ICU from outside of NSW when capacity in other states for an equivalent service is available.

* The ICU flow coordinator works closely with Aeromedical Control Centre and retrieval consultants to locate an ICU bed. The flow coordinator can be contacted on 1800 951 425.

Workforce

The [Public Health Workforce Surge Guidelines \(GL2014_003\)](#) have been developed to assist LHDs in understanding when and how to identify, recruit and utilise surge staff in the event of a pandemic. A team-orientated approach to staffing may need to be considered if lesser experienced staff are used in the ICU to support more skilled staff.^{9,10}

These guidelines for surging staff in response to an event that exceed the existing capacity should be used in conjunction with the [Adult intensive care workforce report in COVID-19 pandemic](#), and local ICU pandemic/disaster policies, with consideration to:

- mandatory staff vaccination
- types of staff required
- potential pools of surge staff
- training needs of surge staff
- activation of the Intensive Care Advisory Service (ICAS)
- logistics and staff wellbeing.¹¹

Infrastructure and logistics

Each facility should have access to, and availability of:

- ICU beds and additional non-commissioned ICU bed spaces
- potential suitable bed spaces in non-intensive care areas which may be used for intensive care patients (e.g. recovery, perioperative units, respiratory units and CCUs)
- access to negative pressured isolation rooms
- access to non-pressurised isolation rooms
- engineering advice regarding air conditioning flows in negative pressure rooms, single rooms and into common areas
- equipment and consumables required to set up and sustain a typical ICU bed space
- standard ICU ventilators, escalating issues of insufficient supply through the LHD to SHEOC
- other ventilation devices, including transport ventilators and those located outside the ICU (e.g. OT and emergency department (ED))

- portable monitoring devices, including portable oxygen saturation monitors (inside the ICU and in other clinical areas)
- personal protective equipment, including providing access to fit testing
- supply of pharmaceuticals required for COVID patients
- vaccination for all staff and allocation of work time to gain access
- staff tearoom facilities away from the clinical area with QR coding to maintain a record of staff entering the tearoom
- staff access to clean scrubs at the start of each shift
- staff access to showering and change room facilities
- the EAP to support wellbeing of at-risk staff.

Infection prevention and control

The CEC's guidance on infection control, [COVID-19 Infection Prevention and Control Manual](#), [Respiratory Protection in Healthcare](#) and [Fit test Assessor: Quick Reference Guide](#) should be used by intensive care clinicians to support decision making around infection control.

Communication with patients and families

ICUs should take measures to optimise communication with patients and families by:

- using tablet devices to enable virtual visiting for patients and relatives when visiting is not permitted in intensive care units
- planning at least daily phone call updates from medical staff to relatives of intensive care patients.

Therapies

- The use of oxygen therapy in the management of patients with COVID-19 is dependent on the patient's clinical status, comorbidities and expected trajectory. Modalities of oxygen therapy may include:
 - high-flow nasal oxygen (HFNO)
 - continuous positive airway pressure (CPAP)
 - non-invasive ventilation (NIV)
 - invasive mechanical ventilation.
- Recent evidence demonstrates that use of CPAP, compared with conventional oxygen therapy and HFNO, reduces the need for intubation or death within 30 days for patients with acute respiratory failure in COVID-19. Early and regular proning improves outcomes in both non-intubated and intubated patients.^{12, 13}
- Guidance on assessment of clinical severity, medical therapies and respiratory support (including proning) can be found in the ACI's [Care of adult patients with COVID-19 in acute inpatient wards](#) document. This guidance should be used to inform local policies and procedures.
- The framework to support provision of [ECMO \(extracorporeal membrane oxygenation\) during the COVID-19 pandemic](#) should be used for patients requiring ECMO.
- The framework to support the provision of [Renal replacement therapy in the ICU during the COVID-19 pandemic](#) should be considered for patients with acute kidney injury.

Resource allocation

During a pandemic, it will be important that consistent decisions are made regarding admission to ICU and continuing care when a meaningful recovery is unlikely.

Triage will be enacted at the same level across the state to promote equity of access of patients to intensive care. It is important that the triage principles to maximise access to ICU are used for all potential admissions; not just infection-related admissions.¹⁴ The process of triaging intensive care resources includes both the process of allocating resources and the process of withdrawal of resources, for all patients that may require intensive care during a respiratory pandemic.

Complex ethical and clinical treatment issues can occur. It may be necessary at some point to begin prioritising limited critical care resources to those with a need for treatment and those who are most likely to survive. Such prioritisation decisions would need to take account of all patients' probability of survival, as well as the availability of limited critical care resources.



NSW ICU PANDEMIC SHORT TERM ESCALATION PLAN (STEP)

The purpose of the NSW Pandemic ICU STEP is to provide a framework that defines the impact of the pandemic on daily operations and the triggers to move to the next escalation level. It enables facilities to employ strategies to manage critically ill patients during each phase of the pandemic.

The principles of this escalation plan are to:

- ensure consistency in application of the STEP across NSW during the pandemic
- provide a tool to accurately communicate facility escalation levels to the SHEOC
- assume facilities have developed and operationalised ICU surge plans for the pandemic
- ensure LHD critical care networking arrangements are confirmed and reinforced
- facilitate escalation of additional resource requirements through LHD channels. LHDs are to escalate requests to SHEOC if unable to manage request
- ensure resources are distributed efficiently by the SHEOC in response to facility demand

Level	Impact	Recommended strategies	Triggers to step to next level
0	Minimal impact on daily operations	<ul style="list-style-type: none"> • ICU surge plans (bed spaces, equipment) developed and recorded in PFP¹ • Critical care networking arrangements confirmed² • ICU workforce surge plan developed to identify additional workforce for surge levels 1-3³ 	<ul style="list-style-type: none"> • ICU approaches maximal operational capacity And/or • Insufficient critical care staff to meet current demand
1	Moderate impact on daily operations ICU approaching maximal operational capacity ⁴	<ul style="list-style-type: none"> • Care delivery for ICU2 patients in other areas⁵ • Escalate additional resource needs⁶ • Transfer of critically ill patients to other facilities as appropriate² • Activate Level 1 ICU workforce strategies³ 	<ul style="list-style-type: none"> • ICU demand exceeds maximal operational capacity And/or • Insufficient critical care staff to meet current demand
2	Severe impact on daily operations Overall demand for critical care exceeding ICU operational capacity	<ul style="list-style-type: none"> • Care delivery for ICU1 and ICU2 patients in additional areas⁷ • Escalate additional resource needs⁶ • Transfer of critically ill patients to other facilities as appropriate² • Activate Level 2 ICU workforce strategies³ 	<ul style="list-style-type: none"> • ICU demand significantly exceeds operational capacity And/or • Insufficient staff to meet current demand with non-standard critical care staffing model
3	Overwhelming impact on daily operations Demand for critical care services significantly exceeds organisation-wide capacity	<ul style="list-style-type: none"> • Activate NSW Pandemic Resource-based decision making⁸ • Care delivery for ICU1 and ICU2 patients in alternative areas⁹ • Escalate additional resource needs⁶ • Activate Level 3 ICU workforce strategies³ 	

NSW ICU PANDEMIC SHORT TERM ESCALATION PLAN (STEP)

1. ICU surge beds and ventilator numbers to be updated a minimum of daily in PFP.
2. NSW Critical Care Tertiary Referral Networks and Transfer of Care (ADULTS) PD2018_011.
3. Adult intensive care workforce report in COVID-19 pandemic.
4. ICU definition may include standard physical ICU beds and designated ICU surge beds in other areas such as CCU, COU, Recovery and Operating Theatre under direction of Intensive Care Consultant.
5. Other identified areas to manage ICU2 patients such as CCU, COU, Recovery, Operating theatres under the direction of Intensive Care Consultant. Consider areas co-located to ICU as a first option to improve workflow. Consider using private facilities as per surge plans.
6. ICU to escalate resource requirements through LHD channels. LHD to escalate to SHEOC as required.
7. Additional areas to manage ICU1 and ICU2 patients may include other identified surge wards and clinical areas under the direction of Intensive Care Consultant. Consider using private facilities as per surge plans.
8. Guidelines for intensive care decision making in a pandemic, activated at the direction of the Ministry of Health Incident Controller.
9. Mobilise critical care delivery in areas without pre-existing critical care infrastructure (non-clinical buildings/temporary hospitals/marquees).

Glossary	COVID+	Patient confirmed positive for COVID-19
	COU	Close Observation Unit
	ICU1 patient	Patient requiring 1:1 nursing care- 1 nurse allocated to care for 1 patient
	ICU2 patient	Patient requiring 1:2 nursing care- 1 nurse allocated to care for 2 patients
	LHD	Local Health District / Specialty Health Network
	Operational capacity	Capacity to manage intensive care patients with adequate bed space, equipment and staff
	PFP	Patient Flow Portal
	SHEOC	State Health Emergency Operations Centre

Assumption: ICU patients that are medically cleared for discharge are transferred to the ward within 6 hours

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