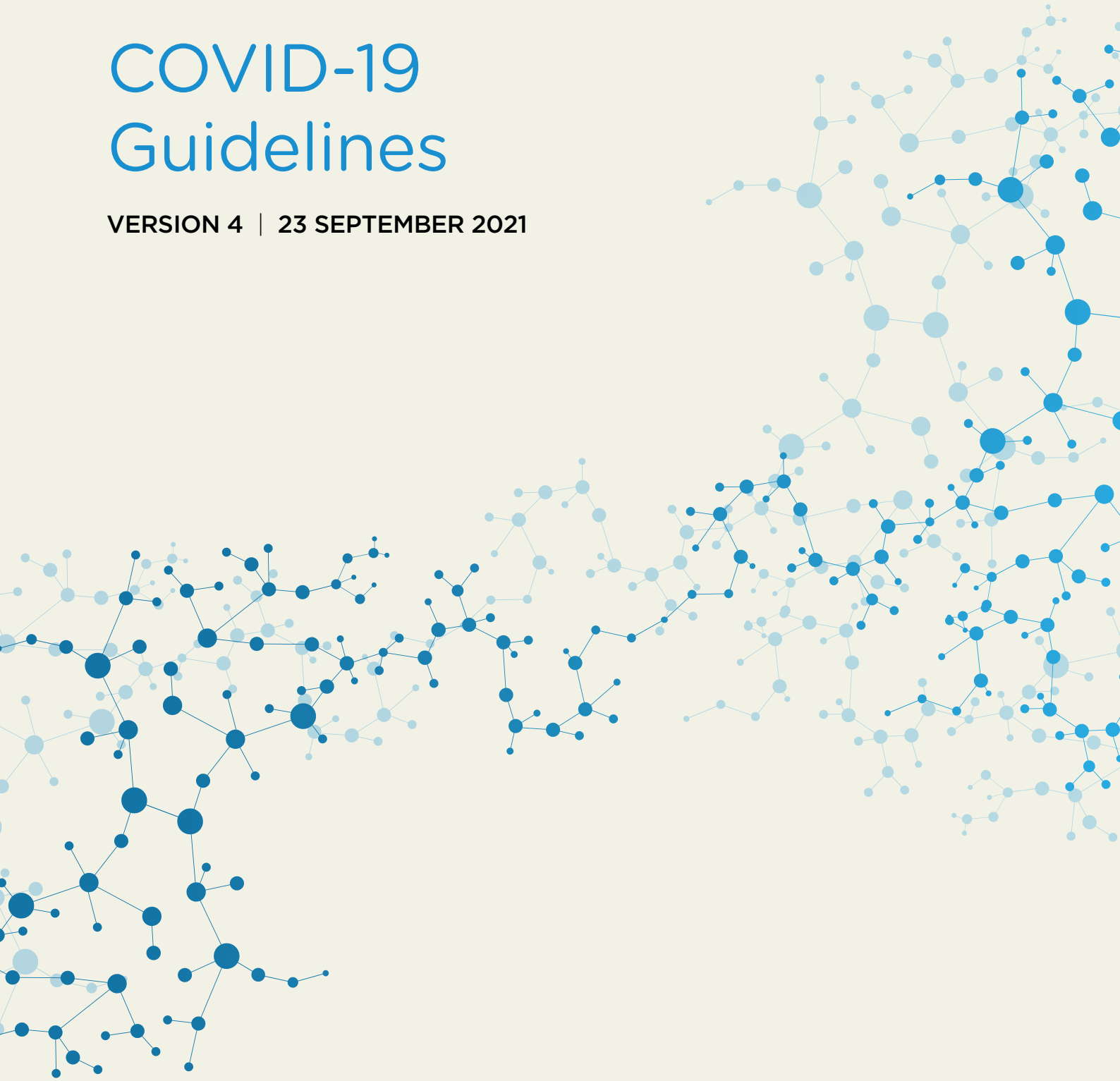
COVID-19 Guidelines

VERSION 4 | 23 SEPTEMBER 2021



ANZICS

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Disclaimer: The Australian and New Zealand Intensive Care Society (ANZICS) COVID-19 Guidelines have been developed to assist intensive care clinicians to prepare and plan critical care services in the event of a pandemic, to provide a safe working environment for staff and patients and to give guidance on the identification and treatment of patients with COVID-19 infection. The recommendations have been put together by a team of specialist Intensive Care doctors and nurses, with representative input from the College of Intensive Care Medicine, the Australasian Society for Infectious Diseases, the Australian College of Critical Care Nurses, and the Australian Society of Anaesthetists. The authors have made considerable effort to ensure the information contained within the recommendations is correct at the time of publication. Information provided has been sourced from the best available evidence and expert opinion. Further iterations of these guidelines will be published as new information comes to hand. The Society accepts no responsibility for any inaccuracies, information perceived as misleading, or the success or failure of any of the recommendations detailed in the document. The Australian and New Zealand Intensive Care Society is not liable for the accuracy or completeness of the information in this document. The information in this document cannot replace professional advice.

Acknowledgement of Country

The authors acknowledge the First Nations of Australia as the traditional custodians of the land and pay their respects to Elders past, present and emerging. The authors acknowledge Māori as tangata whenua and partners under TeTitiri o Waitangi in New Zealand.

Foreword

The last eighteen months have provided the critical care health community with enormous challenges. ANZICS has continued to be proactive in delivering solutions, scientific information and support to health care providers, with the sole intention of maximising patient outcomes and provider welfare. We have been innovative, informative and provided an honest and measured response to all agencies. It is therefore, with an enormous sense of achievement that we present our fourth version of the ANZICS COVID-19 Guidelines. The guidelines have proved to be an invaluable resource for those critical care health care workers charged with preparing, training and delivering care for patients potentially infected or infected with COVID-19.

The team have worked tirelessly to generate practical, reliable and informative guidelines based on the best evidence available. Since our third iteration of the guidelines, much has been learnt from the Australian, New Zealand and international experience. A range of ANZICS COVID-19 publications and data indicate our clinical outcomes are extremely gratifying with excellent results. We will continue to be vigilant, learn and research in order to provide the highest standard of care to Australians and New Zealanders as we learn to live and cope with COVID.

Evidence based best practice guidelines remain an important strategy designed to keep clinicians current in a dynamic critical care environment, where resources are inevitably finite. These guidelines represent many dedicated hours of work by the ANZICS COVID-19 Working Group and are presented in a concise and easily accessible format. The critical care community are immensely grateful for the effort and dedication demonstrated by a remarkably talented, motivated group of professionals.

The fourth edition includes revised content on 'Planning for a Pandemic' and 'Staff Safety', providing valuable information to guide both clinicians and health administrators in a challenging and dynamic environment. The operational 'risk matrix' on escalating phases of the pandemic has been modified to align with other reputable public health documents. In accordance with our whole-of-health systems approach, there are expanded sections on *paediatric considerations, patient transport, metrics and data monitoring, and engineering/ventilation concerns.* We thank our Allied Health colleagues for their valuable contribution to the new *Post ICU Care* section, which delivers sound recommendations for patients with "long COVID-19" following discharge from ICU. One of the very great challenges and tragedies of caring for COVID-19 patients has been the restrictions placed on loved ones. These guidelines provide updated useful strategies for *family engagement and visitation,* as well as an extensively updated section on *staff wellbeing.*

The ANZICS Guidelines are not proscriptive, but rather a valuable resource to be integrated with local recommendations. We can be incredibly proud of the collaborative and pragmatic stance our Society has embraced, in order to deliver meaningful guidance to the critical care community.

It is my sincere belief that these guidelines will decrease both morbidity and mortality. We in ANZICS will continue to strive to deliver the best possible tools to support critical care in our effort to defeat COVID-19. We acknowledge, with gratitude, the efforts of all and trust that you can safely fulfil your privileged duty to care for patients in challenging times. Thank you to our critical care family.

Anthony Holley
President, ANZICS

Summary of main changes in Version 4

The following additions have been included in Version 4 of the ANZICS COVID-19 Guidelines:

1. An expanded section on data monitoring and management
2. A section on “Post-ICU Care” with particular relevance for patients with long COVID-19 following ICU admission
3. Extensively updated section on staff wellbeing and patient transport
4. Revised “Planning for a Pandemic” and “Staff Safety” sections taking into account vaccination and experience with the delta variant, both in Australia and overseas.

Introduction

The COVID-19 viral pandemic has presented an unprecedented challenge to intensive care services around the world. In Australia and New Zealand, we are fortunate to have world-class intensive care services, with a highly trained and professional workforce who are ready and able to serve their communities at this time. This document aims to provide a series of recommendations and suggestions to ensure continued high-quality clinical care in the setting of a pandemic. To develop this guideline, we have drawn on the increasing evidence from around the world on how to treat patients with COVID-19 and learnings from the current pandemic experience as well as the contemporary infection control literature for Intensive Care. This is the fourth version of the ANZICS COVID-19 guideline. The most up to date document and all previous iterations will be found on the ANZICS website www.anzics.com.au

The situation in Australia and New Zealand remains fluid with a substantial fourth wave of COVID-19 infections and the concurrent implementation of significant public health measures. The recurrence of significant numbers of COVID-19 cases have demonstrated the need to prepare our hospitals, intensive care units and staff. The ANZICS community strongly supports all robust public health measures to minimise load on limited ICU capacity for all patients, not just those with COVID-19; and to maintain the health, wellbeing, and sustainability of the intensive care workforce. In 2021, the outcomes for critically ill COVID-19 patients in Australia and New Zealand have been amongst the best in the world. This is due to a number of factors, in particular that our health services have not been overwhelmed and that intensive care units have been able to provide high quality critical care.

The costs of such measures are not insignificant with impact on mental health, access to medical care, access and uptake of investigative services, elective surgery and for many, a major economic burden. Variants of concern (in particular the delta variant) have contributed to subsequent waves and appear to have broadened the at-risk groups particularly the paediatric population. Efficient and practical operational solutions must be developed to maintain the health workforce, particularly in critical care areas including surveillance programs for those caring for suspected or proven COVID-19 patients.

The ANZICS community supports an efficient vaccination program, supported by education, communication and advocacy, targeting a population vaccination target of greater than 80% and reduce the need for public health measures to meet the health system challenges of further waves. ANZICS also supports mandatory vaccination for health care workers.

This document was originally arranged in three parts to provide guidance to critical care clinicians. The following sections remain:

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Planning for a COVID-19 Pandemic

An Operational Guide for Intensive Care Units in Australia and New Zealand

The doctors, nurses, allied health professionals and researchers who comprise the Australia and New Zealand Intensive Care Society (ANZICS) continue to help the Australian and New Zealand communities during the COVID-19 pandemic. Our members provide high quality, compassionate and professional care to the most vulnerable members of our communities every day and this commitment will not change.

As seen in previous disasters, the COVID-19 pandemic will further expose pre-existing inequities in chronic health outcomes and health service delivery. We recognise that the Aboriginal and Torres Strait Islanders of Australia and the Māori of Aotearoa New Zealand are over-represented in disadvantaged populations in ways that make them far more vulnerable to pandemic disease. Indigenous communities in Australia and New Zealand have been disproportionately impacted by previous pandemics. We **advocate** for the best possible access to and provision of critical care support for these groups. We also **advocate** for specific input from Aboriginal and Torres Strait Islander and Māori communities in national and jurisdictional COVID-19 response programs.

ANZICS **strongly supports** state, national and international efforts to reduce the spread of pandemic illness through effective public health measures (i.e. social distancing and masks). This approach is supported by high-quality evidence and significantly mitigates the impact on Intensive Care Unit (ICU) capacity, which is a finite resource.

ANZICS **strongly supports** vaccination and a population vaccination target of greater than 80% (currently in those over the age of 16). Vaccination, in addition to reducing the incidence of COVID-infection, has been shown to reduce severe disease and death. Countries with a high vaccination rate have shown a clear reduction in the number of COVID-19 infections requiring ICU admission.

ANZICS **strongly supports** mandatory vaccination for all healthcare workers who can be vaccinated against COVID-19, with an appropriate program developed for boosters as required.

ANZICS **recommends** all staff have access to appropriate Personal Protective Equipment (PPE) including fit-tested N95 masks or an appropriate alternative.

ANZICS **recognises** that patients without COVID also suffer in a pandemic and **supports** strategies to maintain access to elective surgery and healthcare for all patients.

The most important resource in Australian and New Zealand ICUs is experienced Intensive Care staff, who are trained to provide high-quality care for critically ill patients. The delivery of this service must be supported by government policy and community behaviour.

Considerations in ICU Pandemic Planning

It is **essential** that local and jurisdictional ICU pandemic plans be developed, resourced and implemented where appropriate by all healthcare organisations and that plans align with health department requirements. Pandemic plans should include operational approaches to reduce routine ICU demand, identify and increase physical ICU bed space capacity throughout the hospital, and determine equipment and workforce requirements.

It is **essential** that jurisdictions plan for sustained increased capacity rather than for defined periods of surge. There is clear evidence that mortality increases as a health system experiences ICU demand beyond usual capacity. Even in countries with high rates of vaccination, a consistent level of COVID-19 related ICU admissions persists, albeit with a large proportion from the unvaccinated population. ICU staff often work more in times of need, but this leads to fatigue and burnout and poorer outcomes for patients. The focus therefore needs to be on a sustained safe and effective workforce. We **recommend** collaboration between area health systems, load rebalancing and mobilisation of staff to assist in times of increased demand.

We **recommend** ICU operational status be monitored and reported in an expeditious manner to facilitate decision making processes, minimise system strain and maintain the standards of care required to achieve optimal patient outcomes. Effective information sharing to ensure delivery of the right information to the appropriate persons in a timely manner, is central to an effective pandemic response. We **recommend** ongoing support and funding for the Critical Health Resource Information System (CHRIS).

We **recommend** that ICU operational status be described in terms of both staffing and physical capacity, in recognition that a match between appropriate staffing and adequate infrastructure is central to the delivery of effective critical care services. This is demonstrated in Table 1 with a corresponding tiered, colour coded description of the current status.

We **recommend** that all efforts be made to ensure critically ill patients are cared for in ICUs with adequate staffing and physical resources with minimal compromise to usual models of care. A whole-of-health system approach involving both jurisdictional authorities and ICUs is absolutely necessary.

We **recommend** that ICUs do not enact individual surge plans or change models of care while there is still capacity in nearby areas. Partnerships, such as between private and public hospitals, adult and paediatric ICUs, and through telehealth arrangements to support different level ICUs, should be considered to ensure just and equitable delivery of care for all critically ill patients. This ensures the best clinical care and outcomes for critically ill patients.

We **recommend** that healthcare jurisdictions develop a phased response based on the impact of the pandemic on the operational status of the ICU. Demand for ICU capacity due to COVID-19 infection is likely to fluctuate across the duration of the pandemic and local authorities should develop triggers for escalation and de-escalation of their response. ICUs in Australia and New Zealand should aim to continue to operate with usual models of care (within the “green zone” in Table 1) as far and for as long as possible.

We **strongly recommend** that healthcare jurisdictions utilise periods of low case numbers to address staffing and infrastructure deficits for predicted future demand. It is likely that once vaccination targets are reached, government policies around border closures and lockdowns will be relaxed and a rise in cases will occur, albeit mitigated by vaccination.

Table 1. Operational Status Matrix

Escalating phases of the pandemic response are graded from green to red. (note - the colour system has changed in this edition to align with other public health documents)

		ICU staffing			
		Clinical needs met by regular ICU staffing models	Clinical needs met by redeployment of non-ICU but critical-care trained staff (e.g. ED, Anaesthetics)	Clinical needs met by deployment of non-ICU, non-critical care trained staff	Unable to meet ICU staffing needs
ICU Physical Capacity	ICU retains capacity to meet demand for critical care and ventilation as per usual operations.				
	ICU approaching or at capacity to meet demand for all critical care and ventilated patients.				
	ICU unable to meet overall demand for critical care patients, and at maximum capacity for ventilated patients.				
	ICU is significantly beyond capacity for critical care and ventilated patients.				

Whole-of-Health Systems Approach

A whole-of-health system approach requires mechanisms to have a broad overarching view of current demand as well as projected demand. As a key determinant of capacity, and to improve access to ICU care for patients, visibility of immediate workforce availability is crucial.

We **recommend** the development of a framework to determine risk in order to support planning and the appropriate use of available resources. The components of this framework should include information on local prevalence, epidemiology of clusters, rate of new COVID-19 cases, variants of concern and the level of control measures in the community. Current Australian experience suggests that approximately 1% of identified community cases are admitted to ICU. Determination of risk can contribute to guidance on the use of PPE as well as the level of elective surgery performed.

We **recommend** establishing central coordination, involving senior clinicians, of ICU beds/capacity and transfers within each health system. It is recommended this be enacted whilst working within standard capacity to test the system, and identify and address any issues prior to more advanced phases of the pandemic.

We **recommend** regular meetings of ICU heads of departments (medical and nursing) within jurisdictions to address issues relating to significant differences in demand between ICUs. We recommend the use of local and national dashboards (e.g. the CHRIS dashboard) to help guide decision making.

The movement of patients between units may be required to ensure an equitable distribution of patient numbers and workload. The logistics of staff redeployment to areas of need should be explored early.

Communication and Information Dissemination

Communication within a pandemic is crucial to the successful delivery of safe and effective clinical services. The ever increasing volume of information and literature, research trial engagement and data, evolving guidelines, policies and procedures requires management and streamlining. Priority areas in information dissemination include daily situation reports at a local, regional and state level.

We **recommend**:

- Establishing effective lines of communication to ensure that stakeholders are informed of evolving clinical scenarios and changes in clinical practice guidelines and processes.
- Contributing data to the Critical Health Resource Information System (CHRIS). This is a bi-national dashboard providing real-time data on ICU bed, equipment and staff capacity across Australia and New Zealand. This knowledge assists in minimising delays in patients moving through care.
- The local development of tools for the timely measurement and dissemination of ICU load and capacity. These should facilitate decision making and support for the system-wide allocation of resources and the distribution of patient load.
- Ensuring adequate staffing to support timely data submission to ANZICS CORE and support of research activities, both COVID and non-COVID related. Data is essential to assist planning, review treatments and for the provision of excellent clinical care.

Measures to Reduce ICU Demand

The following measures should be considered to reduce the overall as well as regionalised demand for critical care services and should be enacted before demand exceeds capacity.

Upstream Diversion

Regionalisation of outbreaks can create strain on some hospitals more than others. Subsequent transport of critically unwell patients between hospitals to address strain requires significant resources and time. With the understanding that patient transport and retrieval services have a limited capacity, ANZICS **recommends** exploring upstream diversion of patients before they present to the first hospital.

Streaming will require system-wide visibility of the ambulance network, ED, ward and ICU capacity.

Access to COVID-19 Testing

A substantial proportion of patients admitted to ICU will require testing for COVID-19 infection, particularly during periods of widespread community transmission, and subsequent clearance through polymerase chain reaction (PCR) testing. A delay in test results increases the demand on ICU resources, including staffing and the use of PPE.

ANZICS recommends the establishment of processes which prioritise and expedite the return of COVID-19 results for patients in ICU and other critical care areas (e.g. emergency department and operating theatres). All ICU patients for whom COVID testing is indicated should have rapid testing due to the resource implications and higher intensity of care required.

Deferment or Cancellation of Non-Urgent Elective Surgery

Deferment of elective surgery has significant public health implications and should be time limited. Exploration of all options should take place at early stages with the aim that elective surgery is supported throughout the pandemic. This includes load sharing within the public system and outsourcing to private facilities.

The decision to defer or cancel surgery will depend upon the impact of the pandemic on the operational status of the ICU. These decisions should involve ICU, surgery, anaesthesia and nursing services.

Interruption of elective surgery during amber and red phases will have significant public health implications but may still be necessary for short periods. The black phase will require cancellation of all elective surgical cases (including minor elective and day surgery). This will allow for staff redeployment, improved patient flow and conservation of PPE.

ICU Discharge Facilitation

We **recommend** implementing safe processes to expedite patient discharge from ICU during phases of increased demand. These may include additional support for ward staff to manage patients of higher acuity, or improving flow in discharging patients to areas with greater clinical oversight (e.g. neurosurgical HDUs).

We **recommend** that ICU specific protocols for the de-escalation of COVID-19 isolation measures be developed in consultation with infection control and infectious disease departments and with consideration of relevant guidelines e.g. the Communicable Disease Network Australia (CDNA).

These patients are likely to have prolonged stays and involvement with allied health and rehabilitation services. We **recommend** a multi-disciplinary handover process and establishment of goals of care for all ward transfers.

Reserving ICU Admission for Patients Requiring ICU-Specific Interventions

In more advanced stages of the pandemic (red and black phases), ICU admission should be prioritised for those who require specific ICU interventions such as mechanical ventilation and organ support. This may necessitate the following:

- Extended stays in the theatre recovery areas
- Admission to areas capable of HDU level monitoring (e.g. CCU)
- Additional support/supervision for ward staff to manage patients of higher acuity.

Proactive Consideration of Treatment Goals

We **recommend** early consideration of treatment goals to avoid ICU/HDU referrals or admissions in patients more appropriately managed on the ward. This may be facilitated by ensuring that all patients have documented goals-of-care or equivalent completed upon hospital admission.

Measures to Increase ICU Capacity

ANZICS **recommends** patients are transferred to an ICU with capacity and appropriate infrastructure, rather than remain in an ICU at capacity or with strained staffing and/or resources.

In addition, we **recommend** that all clinical areas with the physical infrastructure suitable to care for critically ill patients should be identified as part of hospital preparedness plans. These include (but are not limited to):

- Complex Care Units or other High Dependency Units
- Perioperative monitoring/recovery areas
- Coronary care units
- Uncommissioned or unstaffed ICU bays
- Decommissioned critical care areas (e.g. 'old' ICUs)

Criteria for high dependency area bed spaces (called ICU2 in some jurisdictions) are available via the College of Intensive Care Medicine guidelines.

We **recommend** hospital executive work with ICU clinicians to develop processes enabling the repurposing of these areas when needed and in establishing workforce models that allow for appropriate critical care staffing across multiple locations. The ability to meet the above standards may be limited in the advanced phases of a pandemic, necessitating adjustments based on the clinical needs of the patients and available resources.

Equipment

We **recommend** visibility of central supply stocks of equipment (at state level) as well as transparent plans for distribution to allow feedback and planning for increased demand.

We **recommend** ICUs should quantify current stocks of equipment (e.g. ventilators, renal replacement therapy, infusion pumps) including consumables and disposables as well as assess potential requirements with increasing ICU load. ICUs should also identify available channels for the supply, storage, and procurement of additional equipment.

This may include:

- Equipment from operating theatres / perioperative environments
- Older but functional equipment not presently in use (e.g. old ventilators which can be operationalised by biomedical departments)
- Manufacturers and suppliers
- Hospital, state or national emergency stockpiles
- Jurisdictional procurement agencies

Table 2. Potential Strategies and Examples for a Phased, Tiered ICU Pandemic Plan

Phase	Impact on ICU	Strategies to consider
1	Minimal impact on daily operations.	Review and test **pandemic response plans**, including: 1. Infrastructure and equipment. 2. Workforce training, planning and support, including the capacity/framework to move staff between sites. 3. Communication plans. 4. Infection control policies and procedures. 5. COVID-19 procedures, diagnostics and treatment protocols. 6. Transport and transfer policies.
2	Moderate impact on daily operations, but still able to meet demand for critical care services.	1. Implementation of measures to reduce demand and increase physical capacity. 2. Ensure regular (daily) discussion between tertiary, metro and regional ICUs to assess clinical strain and resource availability. 3. Transfer of patients (load rebalancing) between ICUs to ensure all patients have access to appropriately staffed and resourced intensive care units. 4. Repurpose alternative clinical areas for non-ventilated critical care patients. 5. Defer or divert non-emergent surgery to private hospitals or other services. 6. Address workforce and staffing needs. 7. Review ICU involvement in non-ICU services (e.g. RRT response, TPN service).
3	Severe impact on daily operations, with ICU unable to meet overall demand for critical care.	1. Repurpose alternate clinical areas for ventilated patients. 2. Reassess requirements and thresholds for ICU admission and discharge. 3. Explore options for building additional ICU infrastructure e.g. field hospitals.
4	Overwhelming impact on daily operations, with demand for critical care services significantly exceeding organisation-wide capacity.	1. Deliver care of critically ill patients in areas without pre-existing critical care infrastructure. 2. Ongoing liaison with hospital and state health services to operationalise additional ICU infrastructure e.g. field hospitals.

Measures to Increase ICU Capacity (Workforce and Staffing)

It is likely that staff shortages and in particular critical care nursing, will be the greatest limiting factor on ICU capacity when there is widespread community transmission of COVID-19 infection. The high chance of staff furlough and potential healthcare worker infections means a significant proportion of ICU staff may be absent from the workplace during advanced stages of the pandemic. The COVID-19 pandemic has also resulted in limited immigration which has had a significant impact on critical care medical and nurse staffing across Australia and New Zealand.

Due to these potential workforce shortages, non-critical care trained medical, nursing and allied health staff may have to assist in the care of ICU patients. This should occur with the relevant managerial authorisations, and under the supervision of critical care trained staff, utilising a team-based model of care.

ICUs and hospitals should prioritise meeting the minimum standards for staffing as per the College of Intensive Care Medicine and the Australian and New Zealand Colleges of Critical Care Nursing guidelines. However, available resources may change depending on the demand placed upon a health service.

We **recommend** workforce planning should include consideration for pandemic specific requirements, such as additional workload from donning and doffing of PPE, the need for additional rest days, and the need to allocate staff to key non-clinical duties such as enforcing infection control procedures. Healthcare jurisdictions must also account for staff furlough, which is likely to occur with staff exposure in the setting of community transmission.

We **recommend** the use of all available resources to optimise workforce capacity, by identifying and potentially redeploying nursing, medical, allied health and other staff.

We **recommend** that core ICU staff maintain operational readiness through ongoing education, simulation and revision of COVID-19 protocols during periods of low community viral transmission.

We **recommend** that where staff are requested to perform duties outside their usual scope of practice due to severe workforce shortages (e.g. anaesthetists taking on an intensivist role), this should be at their discretion, with adequate supervision and orientation and with jurisdictional reassurance regarding indemnity coverage.

We **recommend** data collection and research be considered essential services to help guide future directions through the pandemic. These activities must be supported and if needed, alternatives explored to ensure they continue.

We recognise the importance of training and supporting healthcare students throughout the pandemic for a future sustainable workforce. During advanced phases of the pandemic, significant strains on staffing may not allow traditional student teaching.

We **recommend** exploring other options such as utilising students for appropriate roles in team-based models of care.

If students are undertaking such roles, then we **recommend** that they should be paid for such roles and consideration be given to having an agreement with the health service to ensure they are provided with appropriate indemnity cover, liability insurance and Workcover protection.

Staff Furlough and Testing

ANZICS **recommends** the use of a risk assessment matrix (e.g. CDNA risk matrix **Appendix 6**) for any COVID-19 exposure. In more advanced phases of the pandemic with vaccinated staff it may be that revisions of the quarantine period (in conjunction with local jurisdictions) is necessary with regular testing to allow staff to return to work as appropriate.

We **recognise** there may be exceptional circumstances where quarantine periods for health care workers (HCWs) are adjusted with appropriate testing and infection control measures (e.g. organ retrieval, specialised procedures).

We **recommend** an efficient and operationally effective surveillance program for health care workers caring for COVID-19 patients to support workforce maintenance and safety.

We **recommend** ICUs maintain and update regularly a database (with standard confidentiality) of staff availability and other places or work. This should include categories i.e. general sick leave, COVID infection, COVID exposure/isolation, annual or other leave.

Staff Retention

ANZICS **recommends** in order to facilitate and maintain a sustainable critical care workforce that additional recognition and support is considered which may include special leave or additional remuneration for medical, nursing, allied health and ancillary staff working in ICU.

Nursing

ANZICS **strongly supports** the need for a long term sustainable nursing workforce. It is **essential** that nurse managers, nurse educators and staff development nurse positions are maintained and expanded to support nurses working clinically as well as educate and provide training to post-graduate student nurses.

We **recommend** that nursing staff capable of caring for critically ill patients be identified.

This includes:

- Nursing staff with formal critical care training or experience, but not currently working in ICU (e.g. redeployed, in administrative or non-clinical roles, recently left workforce)
- Paediatric ICU nursing staff
- Nursing staff with experience of critically ill patients in other areas of the hospital (e.g. coronary care nurses)
- Nursing staff in departments with reduced clinical activity who are familiar with a critical care environment (e.g. anaesthetic nurses).

We **recommend** a formal rapid orientation and training program is provided.

A database of who has completed the training program should be created at each ICU. These nurses should work under the supervision of an experienced ICU nurse.

We **recommend** that all current casual or part-time ICU nursing staff be encouraged to increase hours and that examination of roster patterns occur to maximise workforce availability whilst maintaining staff well-being.

We **recommend** that changes to models of care be explored, particularly models utilising team based care with increased ancillary and allied health staff to support ICU nurses (e.g. pharmacists assisting with checking and drawing up of medications).

We **strongly recommend** that changes to models of care for nursing only occur in advanced phases of the pandemic and that ICUs prioritise nursing staff welfare and patient care. Altered models of care with higher patient to nurse ratios are associated with increased mortality and should only be explored as a last resort in the black phase of the pandemic and only initiated at a state/jurisdictional level.

Wearing PPE for prolonged periods can increase fatigue and hence shorter shifts or more regular breaks should be considered. For periods where patients are stable and not receiving interventions, models of care may be altered to facilitate additional breaks. Local union participation is recommended as shift modifications may be impacted by relevant state nursing awards.

If a change in model of care is required, we **recommend** that an experienced ICU nurse should supervise a maximum of 4 up-skilled nurses, and not take on a patient load themselves, to ensure adequate patient safety and staff protection.

We **recommend** that nurses without critical care experience may be suitably trained and redeployed to assist with the following:

- Supervision of staff and visitors donning/doffing of PPE
- Routine nursing care - turning, washing
- Liaison between treating team and family (e.g. daily updates, facilitate video calls)
- Re-supply, storage and inventory of equipment
- Medication delivery and checking
- Documentation
- Maintaining bed management and patient flow information
- Supporting essential pandemic research projects.

Medical

We **recommend** additional medical staffing for the ICU should be sourced by considering:

- Senior medical staff with critical care training, but not currently working in ICU
- Anaesthetic staff (expected reduction in surgical activity)
- Junior medical staff with critical care experience
- Career medical officers with critical care experience.

We **recommend** medical staff should be deployed in a manner that is aligned with their current scope of practice.

- Anaesthetic staff may be deployed as hospital ‘resuscitationists’, making up intubation teams, to lead rapid response teams or to assist in intensive care ideally under the supervision of intensive care specialists. Hospitals may have to perform their own interhospital transfers due to the limited capacity of retrieval services. Anaesthetic staff may also perform this role.
- Medical staff with critical care training may be deployed to manage HDU patients in repurposed clinical areas physically separate from the ICU, under the supervision of more experienced ICU staff.
- Junior medical staff with little to no ICU training may assist with documentation and non-ICU clinical activities.

Additional Considerations

To ensure a sustainable workforce, we **recommend** the following:

- Streamlining of administrative processes (e.g. electronic health record training and healthcare practitioner credentialing) that may otherwise limit staffing flexibility and delay onboarding of new staff members
- Utilisation of furloughed staff for phone/telehealth support to decrease load on onsite/on call staff
- Accommodation for staff who are unable to return home e.g. because of vulnerable family members
- Debriefing and psychological support; staff morale may be adversely affected due to the increased workload, anxiety over personal safety and the health of family members (see section on **Staff Wellbeing**)
- The cancellation of pre-arranged annual leave during a pandemic should only be considered if absolutely necessary.

Allied Health

Physiotherapy

Physiotherapy is beneficial in the respiratory and physical rehabilitation of patients with COVID-19 in ICU. Clinical practice recommendations for COVID-19 and minimum standards for ICU physiotherapists have been published. We **recommend** that physiotherapists with critical care experience be identified by hospitals and facilitated to return to ICU during periods of increased demand.

Patients with COVID-19 are at risk of developing post-ICU impairments, including ICU acquired weakness (ICU-AW). ICU-AW has independently been associated with increased morbidity and mortality.

The risks of COVID-19 transmission from physiotherapy interventions should be weighed against the benefits of the treatment being undertaken. We **recommend** the involvement of senior physiotherapists and medical staff in these decisions.

We **recommend** that physiotherapists provide extended support to the critical care team in the following areas:

- Involvement in proning teams.
- Supporting any possible nursing workforce shortages where skills may overlap or require minimal additional training for critical care physiotherapists (e.g. respiratory care, ventilation management).
- Serving as a conduit between ICU and the ward e.g. advising and supporting ward colleagues with the physical rehabilitation in COVID-19 patients post-ICU.
- Reducing post-ICU disability through referral to existing programs such as pulmonary rehabilitation, or specialised ICU follow-up clinics or support groups.
- Developing local pathways for the identification and management of Post Intensive Care Syndrome.

Pharmacy

The clinical responsibilities of ICU pharmacists include support of drug safety and prescribing, the reconciliation of patient admission medications and the procurement of important pharmaceuticals for patient management. These activities can be challenging during a pandemic, with the potential for medication shortages, changes to drug administration practices and rapidly evolving evidence.

We **recommend** that pharmacists with critical care experience be identified to manage any potential ICU pharmacy service shortfall (due to increased workplace demand or ill/quarantined staff).

The education, upskilling and support of these pharmacists is essential to assist the core ICU pharmacy service, with the aim of maintaining the recommended one pharmacist per ICU team/pod.

Social Work

Social workers provide psychosocial care for patients and their support network during ICU admission. During periods of increased demand, we **recommend** social workers with critical care experience be made available to the intensive care unit with a focus on:

- Bereavement and grief support, including psychological first aid
- End-of-life care and planning
- Risk assessments for vulnerable patients (and those they care for)
- Determining the medical decision maker, particularly in situations of conflict
- Facilitating communication between health teams, patients and their loved ones, particularly during periods of restricted visitation
- Navigating the social care system including newly formed pandemic services.

Dietetics

Dietitians provide expertise in nutrition management for critically ill patients, many of whom may have complex clinical conditions. The long-term impact of a prolonged ICU stay due to COVID-19 infection on nutritional adequacy is unknown.

During periods of increased demand, we **recommend** that critical care specialised dietitians look after the sickest patients, triage workload and provide clinical supervision to staff. Non critical care dietitians may need to be redeployed to ICU, under the supervision of an experienced clinician. This may include the use of nutrition assistants to support clinical dietitians.

Existing models of care may need to be extended to overcome food service delivery for patients in isolation.

Speech Pathology

Speech Pathologists provide expertise in the diagnosis, management and rehabilitation of swallowing functions, for ventilated and non-ventilated patients.

Patients may have diverse communication needs during a pandemic, particularly during periods of isolation and limited family visitation. We **recommend** that speech pathologists be engaged early to enhance and promote effective patient communication with staff and family. This may include augmentative and alternative communication systems.

The commencement of early rehabilitation may reduce the risk of protracted dysphagia and communication disorders. Specific techniques should be employed to minimise the risk of aerosol generation.

Long-term Impairments after Critical Illness with COVID-19 Infection

Many patients who survive an episode of critical illness go on to develop more chronic impairments of physical, cognitive and psychological health, recognised collectively as Post-Intensive Care Syndrome (PICS). Family members may also experience mental health impacts recognised as Post-Intensive Care-Family (PICS-F).

Data suggests a proportion of COVID-19 sufferers develop long-term health impairments, referred to as "long COVID-19". Risk factors for the development of prolonged health impairments include pre-existing frailty and functional impairment, a prolonged ICU stay, delirium and sepsis. Following discharge from ICU, depression, anxiety and the development of post-traumatic stress disorder increase the risk of long-term impairments.

In Australia, many of those who were critically ill with COVID-19 have reported new problems with physical, cognitive and psychological function at 6 months after the acute illness, similar to the experiences reported internationally (**Table 2**).

Table 2: Impairments due to COVID-19 within the International Classification of Functioning, Disability and Health

Body structure and function	Activities (examples)	Participation (examples)
Shortness of breath and persistent cough	Unable to walk long distances	Unable to return to work
Muscle weakness	Unable to stand for long periods	Reduced health related quality of life
Fatigue	Depression, anxiety, PTSD	Difficulties with community activities
Cognitive dysfunction	Unable to concentrate on a task, unable to multitask, altered memory, and altered communication ability	Unable to return to educational activities (school, university, courses)
Chemosensory dysfunction (loss of taste, smell & appetite, nausea)	Unable to do household tasks (cleaning, shopping)	Limited enjoyment in life
Headache, chest pain or palpitations	Sexual health dysfunction	Altered family roles and relationships

Prior to and/or following hospital discharge, **ANZICS recommends** that:

- Survivors of critical illness be screened for new disability using standardised assessment of physical, psychological and cognitive function (**Table 3**)
- Patients should be re-screened through their GP or ICU follow-up clinic at 12 weeks post-COVID-19 symptom onset and to monitor for ongoing symptoms and problems
- Survivors with ongoing symptoms or disability should be referred to appropriate services with a multidisciplinary plan in place
- Peer support be arranged (including through virtual platforms) for patients with ongoing symptoms and their caregivers
- Guidance be provided to patients and caregivers regarding their anticipated trajectory of recovery
- Patients are educated about medications, equipment, rehabilitation requirements and advice about emergency assistance if they deteriorate (see resources in **Appendix**).

Table 3: Recommended screening and follow up services for patients after COVID related critical illness

Time point	Investigations to consider	Follow up by
ICU discharge	Screening tool to identify rehabilitation needs Post Intensive Care Presentation Screen (PICUPS) Intensive Care Society Rehabilitation Framework Review & rationalisation of medications Screen for carer stress and provide advice on available supports	Multi-disciplinary team including allied health, pharmacy
Hospital discharge	General health review including weight Medication reconciliation and de-escalation at discharge Screening tool for rehabilitation needs as progressing towards discharge to community PICUPS-Plus Screen for new functional or mental health impairments • A cognitive assessment test (e.g. Montreal CAT) • Hospital anxiety and depression scale • Post traumatic stress (e.g. Impact of event scale) • 6 minute walk • EuroQol-5D-5L Screen for social isolation & supports - provide information to patient and their family on available peer support programs and carer support programs Discussion of Advanced Care Directives and Goals of Care	Inpatient multidisciplinary team, allied health, or ICU outreach service Summary provided to primary care physician or general practitioner
2-6 weeks post discharge	General health review including weight measurement Review functional and mental health impairments previously identified at hospital discharge Screen for new functional or mental health impairments: • A cognitive assessment test (e.g. Montreal CAT) • Anxiety and depression scale • Post traumatic stress (e.g. Impact of event scale) • 6 minute walk • EuroQol-5D-5L Refer for structured rehabilitation, including pulmonary rehabilitation if required Engage with carer and link with supports Review return to work plan	General practitioner
12 weeks post discharge and beyond	General health review including weight and mental health review If ongoing neurocognitive dysfunction identified refer to specialist and link with NDIS or MAC (MyAgedCare) Carer wellbeing assessment Review return to work plan	General practitioner Mental health Rehabilitation specialist NDIS MAC

Family Engagement and Visitation

Due to the highly transmissible nature of this disease, strict ICU visitation controls are necessary. It is recognised that this can contribute to complicated grief for members of the public and moral distress for healthcare workers. Therefore, **ANZICS endorses** the position statement on facilitating next-of-kin visitation, jointly endorsed by the Australian College of Critical Care Nurses and the Australasian College for Infection Prevention and Control.

Family visitation may be considered appropriate in certain circumstances (e.g. during end-of-life care). Visitor safety is paramount; hence family visitation should be in alignment with jurisdictional recommendations, and where local resources and staffing permit.

Family visitation should be limited to the next-of-kin or immediate family, who must be deemed fit and well, not self-isolating due to COVID-19 exposure, and not currently COVID-19 positive.

A member of the ICU team should take responsibility for informing visitors about how the visit will be conducted, pre and post-visit hygiene requirements, use of PPE, anticipated timing and duration, and provide instructions for the bedside visit. On arrival, family visitors should be assisted to don PPE and escorted to the bedside. Where possible, the family/ visitors should be provided with time alone with the dying person. At the end of the visit, an ICU staff member should assist the family visitor to doff all PPE and exit. Where warranted, immediate emotional support should be provided, and details of additional support services such as pastoral care or bereavement support services provided.

We **recommend**:

- A communication plan is established with families shortly after ICU arrival, offering different communication platforms and identifying and mitigating any potential barriers to communication and engagement
- ICUs explore and implement methods of communication that allow for patient and clinician interaction with family members, and establish appropriate governance and best-practice guidelines
- Families, where possible, allocate one family member as the key contact, who will take responsibility for disseminating information amongst the greater family unit
- ICUs allocate one person or a team to provide daily updates for each patient to the nominated family member
- Equipment/technology with secure platforms be made available for video conferencing between patient, family and medical staff. This includes a means for communication with relatives who may be overseas or interstate. Units should liaise early with information technology departments as multiple devices with Wi-Fi capability may be needed
- Families are encouraged to maintain contact with patients through other means, such as web-based remote family conferences, diaries, drawings and text messages
- Consideration be given to how the explanation of restrictive visitation policies is delivered (standardised communication, leaflet, public-facing website)
- Mechanisms exist for the delivery of essential items to the patient such as glasses, dentures, phone chargers etc.

Remote, Rural and Regional Considerations

ANZICS recognises that patients in remote, rural and regional areas are at additional risk of health disadvantage in a pandemic. **We advocate** for geographical equity through the maintenance of usual standards of care for all patients. This includes the availability of sufficient resources such as equipment and workforce, ongoing access to clinical trials, contributions towards jurisdictional databases (e.g. CHRIS, ANZICS APD/ANZPICR) and timely support for patient management.

ANZICS **recognises** that remote communities are at increased risk and **supports** jurisdictional decisions to protect these communities through public health measures until appropriate vaccination targets are met.

ANZICS **strongly supports** the recommendations in the Australasian College for Emergency Medicine's COVID-19 Toolkit for Rural Emergency Care Facilities in Australasia. This document contains an audit tool for remote, rural and regional health services to assess their critical care capacity and ability to provide ventilatory support.

Workforce

The most likely rate-limiting factor in supporting remote, rural and regional critically ill patients during the pandemic is critical care qualified nurses. There will also be shortages of medical and allied health staff. Health services with staffing models relying on fractional appointments, fly-in-fly-out (FIFO), locum and/or agency staff are at particular risk.

Mobilisation of staff to non-metropolitan areas has additional logistical challenges related to geography (e.g. accommodation and transport) that require consideration. The ability to utilise team based rostering to mitigate the risk of staff cross-contamination and reduce the impact of staff furlough is logistically more challenging in rural and regional settings.

We **recommend**:

- Anticipating workforce shortages/challenges early and addressing these in a proactive manner
- Identifying local nursing staff and other local health care workers for a critical care upskilling program
- Establishing and/or formalising links with metropolitan or larger regional units to facilitate critical care upskilling
- Exploring on-call provision from alternative sites to support local intensivists who may have a greater on-call burden
- Identifying, facilitating and providing practical support for locum doctors and agency nurses who wish to remain at a regional/rural health centre for a longer period.

We **advocate** for a centralised process to mobilise critical care trained staff to areas of need during local outbreaks of the pandemic. This may include periods where large numbers of healthcare staff are furloughed.

Capability and Capacity

In facilitating the care of critically ill patients in remote, rural and regional health services, we **recommend**:

- An emphasis on early, proactive community and hospital-based goals of care discussions, as these may influence decisions to treat locally or seek retrieval.

We **recommend** consideration of regional hubs to centralise staff and resources. The capability of the hub needs to be defined, measured and resourced with appropriate metrics. The hubs should aim to care for lower acuity patients with clear triggers for transfer to metropolitan centres.

In planning to expand health service capacity, we **recommend**:

- Hospitals nominate a COVID-19 critical care leadership group with delegated authority for pandemic planning and management
- Resident intensivists in regional ICUs allocate time to proactively assist local acute wards and smaller hospitals in their planning and training for pandemic critical care
- Hospitals take a regular inventory of ventilators, ICU equipment, medications, PPE, available clinical areas, and diagnostic services (including COVID-19 testing).

In the event that health services are expected to manage ventilated patients beyond existing capacity, we **recommend**:

- Identification of staff (medical and nursing) with critical care and airway skills to provide 24/7 cover of ventilated patients.

In health services unable to provide invasive ventilation, we **recommend**:

- Plans are made to facilitate early retrieval
- Consideration be made towards what respiratory support is feasible. This may include the provision of HFNO and NIV with appropriate support and caution.

Education

In order to maintain a workforce with the necessary knowledge and skills and to ensure that staff stay informed of changes in COVID-19 management, we **recommend**:

- Use of the National COVID-19 Clinical Evidence Task Force Guidelines and appointing medical and nursing leads to keep staff informed of changes
- Accessing educational resources through local and remote platforms (e.g. by video link to educational sessions in regional and metropolitan hospitals).

Telehealth

ANZICS recommends expanding the use of telehealth and virtual care services to provide additional advice and support to health care staff in facilitating improved local care and patient transfer considerations.

ANZICS recommends a central telehealth service or that metropolitan and larger regional units take responsibility to provide telehealth support to smaller regional units. Daily virtual ward rounds in advanced stages of the pandemic should be considered.

Staff Support

Fear and anxiety during the pandemic may be more pronounced for remote, rural and regional staff for multiple reasons including the increased risk of treating friends, family or colleagues, heightened resource restrictions and challenging clinical conditions.

ANZICS recognises that psychological support can be more challenging in rural and regional areas. We **advocate** for equity of access to resources that support staff wellbeing and psychological stress mitigation.

Paediatric Considerations

When compared with adults, COVID-19 infection is an uncommon cause of severe or critical illness in children. Most children with COVID-19 are asymptomatic or have only mild respiratory signs, but between 2 and 20% of hospitalised children with COVID-19 infection may need ICU admission. This is based mainly on data from childhood infection with the Alpha variant.

Children under 12 years will remain a vulnerable cohort if they are not included in the vaccination programme. There has not been modelling of the impact on paediatric critical illness and PICU admission of the Delta strain as a single infectious agent or as co-infection with Respiratory Syncytial Virus (RSV) or other respiratory viruses.

Children with chronic underlying diseases are susceptible to serious complications of COVID-19 infection. Paediatric patients with cerebral palsy, chronic lung disease, congenital heart disease, type 1 diabetes, immune problems and cancer, are more likely to be hospitalised and are at higher risk of dying than the general paediatric population. Adolescents with obesity or hypertension are also at an increased risk of complications.

Clinical manifestations of COVID-19 infection in children may differ from adults. In addition to the more commonly seen manifestations such as pneumonitis, COVID-19 infection may lead to a generalised viral illness, with high fever (T>39 C), erythematous rash, diarrhoea and vomiting.

Rarely, COVID-19 in children is associated with a delayed hyper-inflammatory syndrome called Paediatric Inflammatory Multisystem Syndrome - temporally associated with SARS-CoV-2 (PIMS-TS). This can appear similar to Kawasaki disease and toxic shock syndrome and may be fatal. PIMS-TS may occur during an acute COVID-19 pneumonitis or more commonly 2-4 weeks afterwards when evidence of Covid infection may only be manifest by detection of Covid antibody.

We **recommend** that the identification and management of COVID-19 infection in paediatric patients is in accordance with the National COVID-19 Clinical Evidence Taskforce https://covid19evidence.net.au/.

We **recommend**:

- The same principles of infection control and staff safety as for adult ICU patients (see **ANZICS guideline Section 2: Staff Safety**)
- Strategies are implemented to avoid impacting the ongoing intensive care management of paediatric patients.
- The developmental and psychosocial needs of children are considered when infection control measures are instituted.
- There is a low threshold for the testing of paediatric patients and parents/carers on ICU admission to ensure early clearance from COVID-19 precautions and greater certainty on measures to mitigate risk of inadvertent cross infection of vulnerable patients and families. In periods of high community transmission it may be appropriate to test all paediatric ICU patients and essential visitors on admission.
- Visitors are restricted to one or two family members during periods of significant community transmission (see **ANZICS guideline Pandemic Planning: Family Engagement**). This should be based on an assessment of COVID-19 infection risk and may involve surveillance swabs of visiting family members, with specific measures to manage the needs of children with COVID-19 positive parents or carers.

Physical distancing and mask wearing reduces the incidence of unplanned paediatric ICU admissions with seasonal respiratory illness. Additionally, the deferment of non-urgent elective surgery during periods of widespread COVID-19 transmission may increase PICU bed capacity.

It is possible that PICU clinicians may need to be redeployed to manage adult patients during periods of increased demand. We **recommend** that any staff redeployment be supported with appropriate training and education. This should only occur if there are sufficient resources within the PICU workforce to manage essential services (e.g. paediatric trauma, burns, organ transplant and urgent surgery) in addition to the emergency admission of COVID-19 and non-COVID-19 infants and children. It should take place as part of a system-wide plan to manage an overwhelming case load in adult facilities.

Critical Care Outreach and Rapid Response, Medical Emergency and Code Blue Teams

The principles of critical care outreach should have pre-emptive, proactive and reactive solutions to:

1. Identify patients who are unlikely to benefit from ICU treatment and guide appropriate goals of care discussions
2. Identify patients who need ICU as early as possible by:
   a. Pre-emptive rounding and huddles between ward-based and ICU-staff
   b. Modification of RRT calling criteria
3. Prevent In-Hospital Cardiac Arrest (IHCA) in COVID positive patients, as this is associated with an in-hospital mortality > 90%.

Where possible, there should be a senior decision maker (senior registrar or consultant) from ICU available to assist in these processes.

ANZICS **supports** the recommendations of the International Society for Rapid Response Systems (iSRRS). Modifications to rapid response team (RRT) models of care should align with these guidelines whilst being individualised to the needs and resources of each jurisdiction.

In order to minimise the risk of healthcare staff infection, we **recommend** that:

- Health services review Rapid Response Team models of care for ward patients with COVID-19 infection, with consideration given towards the need for enhanced infection control measures
- All RRT members receive training in donning and doffing of PPE, and that PPE for airborne precautions is readily available to RRT members for patient interactions
- During a MET call or code blue, entry to a patient's room should be limited to vital members of staff
- A therapeutic escalation plan be developed for patients with COVID-19, with particular consideration to appropriate infection control measures for aerosol- generating procedures
- Consider inclusion of notification of potentially infectious COVID status in the pathway for RRT activation (via PA announcement or paging tree)
- Where possible, wards should identify appropriate locations for delivery of high-flow nasal oxygen, non-invasive ventilation, and endotracheal intubation
- If aerosol-generating procedures (AGP) are required, these should ideally be performed in a negative pressure room, however, this needs to be balanced with the safety of transporting the patient.

In order to reduce the demands on ICU staff and facilitate optimal patient management and disposition, we **recommend** that:

- All patients have their goals of care clarified on hospital admission, and that this be communicated clearly to the RRT members on arrival
- Hospitals should increase the ICU workforce to ensure sustainable rostering of staff to critical care outreach services
- If staffing permits, the ICU will maintain a senior decision-maker for the assessment of patients outside the ICU. This may also include the use of virtual ward rounds or huddles to limit traffic through COVID wards
- Alternative non-ICU based MET team staffing models should be considered as part of advanced phases of the pandemic response. These models may involve RRT staffing by non-ICU staff, but must include appropriate training of members
- Clinical criteria for RRT activation in COVID-19 patients should pay particular attention to escalating oxygen requirements (FiO2), respiratory rate and work of breathing, which have been associated with adverse outcomes. These criteria may need to be altered depending on the stage of the pandemic, caseload and emerging evidence for treatment
- Hospitals identify COVID-19 patients at risk of clinical deterioration and develop a strategy for information sharing with critical care services. This will enhance the clinical visibility of the ward burden of COVID-19 patients and anticipated admissions to ICU. This may also include unique RRT alerts for COVID-19 patients to enhance staff preparedness.

Patient Transport

In principle, the movement of patients with COVID-19 should be limited with all efforts made to ensure the patient is initially admitted to the appropriate location and only necessary investigations are performed outside the ICU. Staff safety is paramount and all staff involved in transferring a patient with suspected or proven COVID-19 infection must be proficient in the use of PPE and infection control procedures.

Intra-hospital Transport

Once a patient is admitted to the ICU, transport outside of the ICU should be limited. If transport is required, then coordination at a senior level is mandatory to ensure safety standards are maintained.

We **recommend** the following for intra-hospital patient transport:

- All staff undertake airborne precautions with appropriate PPE at all times
- Intubated patients should have closed ventilator circuits with a viral filter in situ
- Hallways must be cleared and only essential staff should accompany the patient. This should be planned ahead of time where possible to avoid any breaches. Staff not involved in the transfer should not come within 2 metres of the patient. The shortest and safest transport route should be identified.
- A designated staff member in PPE, maintaining a 2 metre distance from the patient is needed to open doors, access lifts and ensure infection control precautions
- Clear agreeme nt on which speciality/team will be responsible for the intrahospital transport of critically ill patients from ED to ICU
- ED staff involved in any prolonged or resuscitative care should ideally not transfer the patient or don fresh PPE to do so.

Inter-hospital Transport

Capacity for inter-hospital transport is likely to be limited and may significantly impact access to critical care for regional Australian and New Zealand patients. Redistribution of patients as part of a load rebalancing strategy to address health areas under strain will involve patient transport services (both aeromedical and road). We **strongly support** efforts to increase the capacity of these services.

A balance needs to be made between having patients treated at a centre with greater resources and overwhelming patient transport services with high numbers of low acuity transfers. Transferring patients later in their clinical course may necessitate intubation for patient and staff safety or logistical reasons as higher levels of oxygen flows via mask or nasal prongs may exhaust oxygen supplies.

We **recommend** a means of central coordination for inter-hospital transfers utilising senior clinicians in later stages of the pandemic (red and black). This should leverage off existing governance structures and incorporate clear lines of communication, balancing individual clinical need, against local and system-wide resources. This will allow treating clinicians to focus on clinical care.

We **recommend**:

- That transfer capacity be explored locally (e.g. using local anaesthetists and ambulances) in addition to existing retrieval services
- Accessibility to teleconference technology to allow face-to-face discussions between senior clinicians to discuss cases and provide support and advice
- Clear agreements on accepting facilities be in place prior to transport
- The development of local guidelines or triggers outlining clinical criteria (e.g. FiO2, respiratory rate) where transfer for care escalation is mandated
- That early transfer be considered for sites unable to provide short term ventilatory support to avoid the need for intubation
- That rapid and accurate COVID-19 point-of-care testing be used. This will assist with clinical management and help determine whether co-transfer of more than one patient is possible
- That retrieval services call ahead when a clear arrival time is known so that patients can be escorted directly to ICU by dedicated staff in appropriate PPE
- That retrieval services examine their ability to provide NIV or HFNO and if safety concerns are present for staff or patients, then patients are intubated prior to transfer. Patients receiving oxygen should where possible have a surgical mask placed over their oxygen device
- That PPE decisions are based on clinical and epidemiological risk factors with reference to the CDNA or jurisdictional PPE matrix
- Retrieval/transport crews be provided a safe area to doff their PPE and decontaminate prior to returning to their point of origin. Crews cannot eat or drink whilst wearing PPE and so should be given access to refreshments.

Facilitating Emergency Department (ED) Management

ANZICS **recommends** that ICUs co-ordinate with EDs to support the management and disposition of critically ill patients during periods of high COVID-19 patient load.

Inter-departmental plans should include the early referral to ICU of patients (both COVID-19 and non-COVID-19) requiring physiological support as a means to optimise patient flow and improve emergency department capacity.

We support the Australian College of Emergency Medicine COVID-19 guidelines and **recommend** they be considered in the development of local policies.

Metrics and Data Monitoring

Metrics and data monitoring are central to the provision of a safe and high-quality healthcare system. They are an essential component of the NSQHS Clinical Governance Standard (Standard 1 Action 1.08 and 1.09), which aims to ensure the implementation of a framework within health service organisations that maintains and improves the safety and quality of health care.

General Principles

We **recommend** that metrics and data monitoring take place within the framework of a programme with clear and achievable goals and practical steps for implementation. Metrics in themselves, outside of a plan of action, are without meaningful value. The principles of data security and structured governance processes around the collection, storage and reporting of data are the same during the pandemic as they are at other times.

ANZICS **recognises** that the collection of relevant and accurate data is required to provide visibility of activity and resources of a health care system and the intensive care services within that health system. The secondary purpose of this data is to provide a basis for health policy development, future health service and intensive care planning and research.

We **recommend** that:

- Data should be accurate and consistent, collected and submitted at regular intervals to provide both real-time information and longitudinal data
- The frequency of data assessment reflects the needs and goals of the program Operational information often requires near real-time availability of data. In contrast, outcome/performance monitoring and clinical trials typically involve measurement and reporting of information over longer periods of time
- Metrics be easily obtained and recognised as useful by all stakeholders and serve to advance scientific progress or inquiry
- Metrics evolve to keep pace with scientific progress and be regularly reviewed to ensure relevance
- The standard principles of data collection are adhered to, including the security, storage and use of data. Data collection should occur within existing approvals
- Pre-existing principles such as 'The Five Safes Framework' promoted by the Australian Institute of Health and Welfare, be applied to the reporting and sharing of information resulting from these data.

The development and application of meaningful metrics will require human, financial and computational resources. ANZICS **recommends** that data collection systems should be integrated into the health care system and have longevity. We **recommend** that data collection should be performed and overseen by dedicated staff who are funded and trained specifically for this role. We **recommend** delivery of care to all critically ill patients is monitored and a well-established reporting system is in place, so that analysed data can be interpreted and findings can be actioned by relevant bodies/authorities.

Metric Considerations in Pandemic Planning

ANZICS **recognises** that metrics and data collection have been invaluable during the COVID-19 pandemic. The development of the Critical Health Resources Information System (CHRIS), a nationwide ICU dashboard which collects information twice daily and has allowed access to real-time data on ICU activity and capacity. This has helped to facilitate load rebalancing during periods of health system strain in Australia.

We **recommend** that processes established during the pandemic which have ongoing value (e.g. CHRIS) be integrated into routine health service provision on a permanent basis with appropriate government support and funding.

We **recommend** the expanded use of electronic health records to ensure ongoing data collection for research purposes whilst minimising the number of required research staff and reducing their exposure.

ANZICS **advocates** for a whole-of-health systems approach which requires mechanisms that have a broad overarching view of current and projected demand on the healthcare system, including critical care services.

This approach is required not only for the current pandemic but is valuable at any other times of strain for the healthcare service e.g. natural disaster, extreme weather event, mass casualty event.

A whole-of-health systems strategy requires collection of information about:

- Individual patients
- ICUs and hospitals to ensure measurement of resources (e.g. staff, ICU beds)
- Processes of care (e.g. routine VTE prophylaxis, specific treatments for COVID-19)
- Outcomes (e.g. mortality, length of stay, disability, and long-term survival).

Recommendations for Data Collection and Reporting During the COVID-19 Pandemic

To ensure an informed, coordinated and adaptive response to the pandemic, we recommend that relevant information should be collected about:

1. Intensive Care Units
   - Operational information about ICU demand, capacity and resources
   - System planning information about infrastructure, resources and processes of care
2. Individual patients
   - Registry-level information about demographics and outcomes of all ICU patients
   - Epidemiological information about COVID-19 patients
   - Targeted in-depth information for interventional clinical trials
3. Staff
   - Wellbeing and workload
   - Infection control and vaccination.

We **recognise** that the relevance/importance of individual metrics and data sets listed below may change over time and **recommend** that these data sets evolve to keep pace with scientific knowledge and changes within the healthcare service. This may include the inclusion of biologic samples.

Information about ICUs – Capacity and Resources

Real-time operational data

Demand for ICU services, overall available resources and operational capacity should be monitored at least daily, with information from every ICU.

We **recommend** that operational information should include total numbers of:

- Available and physical ICU beds
- All critically ill patients occupying ICU beds, including information on specific therapies such as mechanical ventilation and renal replacement therapy
- COVID-19 patients including information on those who require mechanical ventilation.

We **recommend** that aggregate reports derived from this data be made widely available to all stakeholders including clinicians, health departments and the public (e.g. a real-time dashboard such as CHRIS).

Snap-shot in-depth surveys

These surveys provide more in-depth information about resources, hospital processes of care and targeted patient information at particular points in time. We **recommend** that the benefits of the detailed information obtained from such surveys be balanced against the burden and frequency of data collection.

The ANZICS Surge Survey provided detailed information on potential ICU physical bed capacity, equipment, isolation rooms and staffing in response to the increased demand caused by the COVID-19 pandemic. We **recommend** the annual routine collection of information about baseline ICU resources, staffing, costs/funding and processes of care through the ANZICS Critical Care Resources Registry Survey.

The ANZICS CTG point prevalence program collects observational data at a single time point and has been used to provide opportunities for capacity growth and development of research programs.

ANZICS **recommends** that both real-time data monitoring and snapshot surveys be used to provide data for the predictive modelling of demand and that this demand be matched to available resources and capacity.

Information about Patients – Monitoring of Outcomes, Epidemiology, and Clinical Trials

Routine monitoring of all ICU patients

ANZICS **recommends** that the routine collection of a minimum patient dataset with reporting of this information through the ANZICS Centre for Outcome and Resource Evaluation clinical quality registry program, should be maintained, even at peak times of the pandemic.

This ensures a usual standard of care is being delivered to all ICU patients including those with COVID-19 and allows for benchmarking at a local, national and international level. Failure to submit timely data should in itself be considered a potential marker of poor quality of care or system strain at an ICU.

Epidemiology of COVID-19 patients admitted to ICU

We **strongly recommend** the contribution of information to a detailed patient level dataset which collects information on specific characteristics, treatments, and outcomes of critically ill patients with COVID-19 such as the Monash University SPRINT SARI study.

This information allows:

- Reporting of overall demographics and outcomes of patients with COVID-19
- Assessment of contemporary treatment trends (such as the increased use of proning and high-flow nasal oxygen during the first year of the pandemic)
- Translation of research into clinical practice (such as the adoption of steroids).

Clinical Trials

Interventional clinical trials have been pivotal in the development of new therapies for the treatment of COVID-19. We **strongly recommend** the inclusion of patients to both observational and interventional clinical trials (e.g. SPRINT-SARI and REMAP-CAP).

We **encourage** the alignment of individual data elements with pre-existing collection mechanisms by:

- Using standardised data definitions
- Multisite collaborations
- Using pre-existing clinical quality registries
- Research partnerships
- Facilitating the data linkage of pre-existing information (e.g. the national death index for long-term survival data)

This approach minimises duplication and the additional burden of unnecessary data collection. Data collected for other purposes should be done so within a framework which allows potential use for other purposes while maintaining individual patient confidentiality.

Information about Staff

We **recommend** that ICUs collect, maintain and report data related to rostering and workload. In particular, this should include information on deployment of non-critical care trained staff to ICU. This should be used to anticipate and plan for changes in workforce demand during different phases of the pandemic.

In order to support healthcare leaders in monitoring staff wellbeing, we **recommend** collection and reporting of data related to staff stress and burnout.

This may include factors such as:

- System stressors (staffing levels, patient/staff ratios)
- Retention and recruitment of staff
- Indicators of staff in difficulty (complaints and errors).

To ensure staff safety, we **recommend** that ICUs maintain records of:

- Vaccination status
- Mask fit testing
- PPE training and competence
- Participation in surveillance screening (if required)
- Staff impacted by COVID-19 exposure
- Staff furlough
- Staff COVID-19 infection.

This helps to protect individual staff members, their colleagues, and patients from infection, and allows targeted support for those who need it most. In addition, it is important to ensure these data are available to ICU staff for local operational purposes.

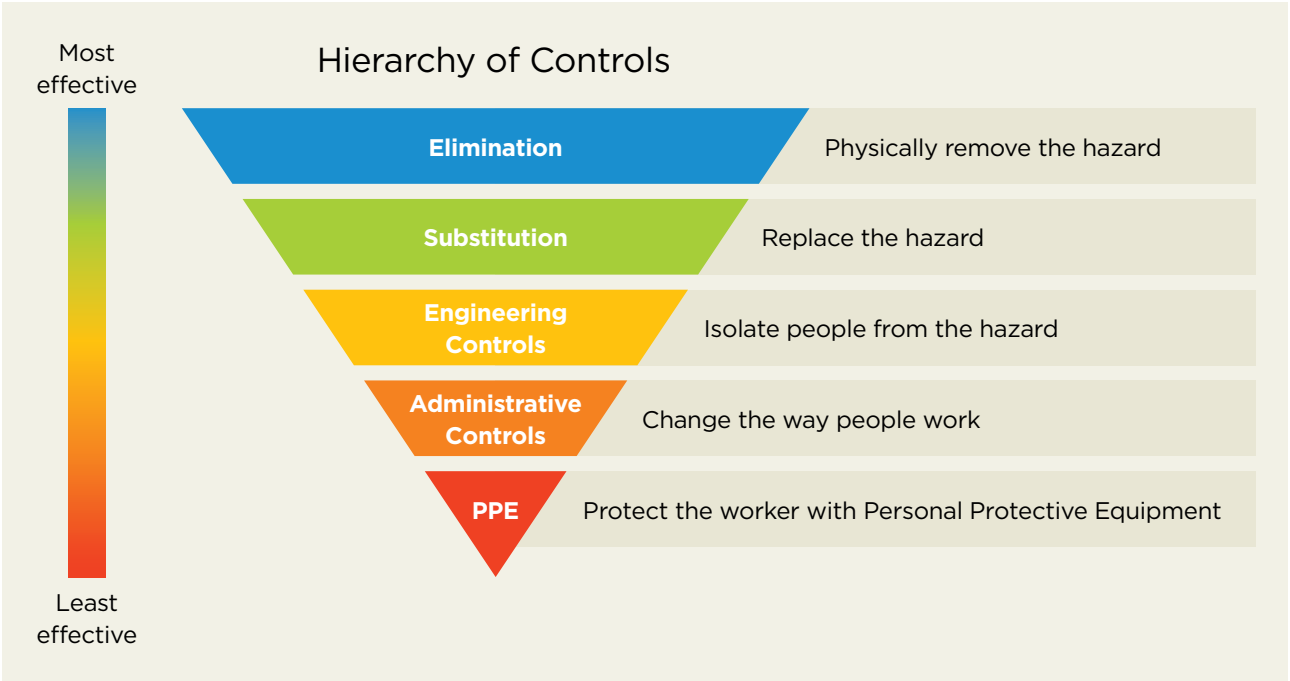
2

Providing a Safe Working Environment

Staff Protection and Sustainability

General Principles of Infection Control

Controlling exposure to COVID-19 is critical for protection of health care workers. This can be represented by a hierarchy of controls. Engineering controls are designed to remove the hazard at the source before it comes in contact with the worker. Administrative controls and Personal Protection Equipment (PPE) are frequently used with existing processes where hazards are not particularly well controlled. Safety of staff is paramount to protect the individual health care worker and to ensure a viable workforce for the duration of the pandemic.



In Australia, the national infection control standards are the national standard AS/NZS 1715: 2009 and National Health and Medical Research Council, Australian Guidelines for the Prevention and Control of Infection in Healthcare (NHMRC, 2019). There are extensive national and jurisdictional COVID-19 guidelines and resources. (Australian Government Department of Health, 2020).

COVID-19 Transmission

There are three commonly accepted modes of viral transmission:

1. Direct contact with contaminated surfaces (fomites)
2. Larger respiratory droplets
3. Smaller micro-droplets known as aerosols.

In the context of SARS-CoV2, there is increasing evidence for airborne transmission. In 2020 healthcare workers constituted a substantial proportion of all COVID-19 infections in Australia, and data suggests that the majority of HCWs acquired it at the workplace. HCW infections lead to infection in other HCWs, close contacts and patients. Subsequent staff furlough has a significant impact on workforce sustainability.

Engineering Controls

Introduction

Engineering controls are designed to remove the hazard at the source before it comes into contact with the worker and can be very effective as long as these are designed, used and maintained properly. Engineering controls include:

- Process controls - Change the way an activity or process is performed to reduce the risk of transmission.
- Enclosure and isolation - Ensures separation between the patient and the HCW.
- Ventilation - Moves outdoor air into a building or a room, and distributes the air within the building or room..

Patients are placed in higher-order engineering control areas before using lower-order areas.

Patient care areas include:

- Class N rooms are negative pressure isolation rooms used to isolate patients capable of transmitting airborne infection. A Class N room should have a functional anteroom for donning and doffing PPE. Airborne PPE precautions are still required. Doffing is performed in the anteroom. There are a limited number of negative pressure rooms across Australia and New Zealand.
- Class S rooms are standard rooms which can be used for isolating patients capable of transmitting infection by droplet or contact routes. Class S rooms have no negative pressure capability. Airborne droplets can remain in the air for up to three hours post procedure. These rooms must be reviewed by engineering to optimise airflow and air exchanges.
- Open Cohort Areas have no negative pressure capability. These areas must be reviewed by engineering to optimise airflow and air exchanges. In an open ICU cohorted area with one or more COVID-19 patients, the whole area is **strongly recommended** to require airborne PPE precautions with careful attention to the clear designation of safe donning and doffing areas.

We **recommend** COVID-19 patients ideally be treated in a Class N negative pressure single room. If Class N rooms are not available, then the preference should be Class S single rooms (with appropriate engineering and ventilation considerations) with clear areas designated for donning and doffing of PPE.

Once all Class N and Class S rooms are exhausted, then consideration could be given to moving patients to a facility with available Class N or Class S rooms. If not possible, patients will need to be cohorted in areas that are physically separate to areas containing non-COVID-19 patients.

We **recommend** that aerosol-generating procedures (AGP) are performed in Class N rooms. If performed in a Class S room or cohorted area, engineering controls should be optimised for rooms selected for this purpose. This should include exhausting air conditioning to an external point and at least 6, ideally 12, air exchanges per hour.

General Ventilation System Considerations

Intensive care heating, ventilation and air-conditioning (HVAC) systems are critical to maintaining good 'indoor air quality' and reducing the transmission of airborne disease. Older intensive care units may not meet current standards with lower number of air changes per hour (ACR) and ventilation systems with re-circulation.

We **recommend** that hospital engineering advice should be sought to explore configuring HVAC systems to increase the air changes per hour (ACR) with the outside and avoiding air recirculation, incorporating HEPA filters within existing HVAC systems and changing indoor airflow patterns e.g. vertical rather than laminar flow. Temporary negative pressure rooms could be set up with the use of portable negative air units fitted with a high efficiency particulate air (HEPA) filter.

We **recommend** the use of portable HEPA air cleaners in high traffic areas such as changing rooms, tea rooms and doffing areas.

Administrative Controls

Administrative controls change the way health care workers work to reduce the risk of COVID-19 infection. These workflows include ways to minimise viral exposure and reduce the risk of HCW and patient infection.

Minimise HCW Contact with Suspected or Confirmed COVID-19 Patients

We **recommend** that all patients are assessed for potential COVID-19 infection. Patient screening should be in line with the latest national recommendations for COVID-19 case definition and should include determination of clinical history, contact and travel history. Patients deemed at risk should be isolated and tested for COVID-19.

We **recommend** that workflows be established to minimise the number of staff and minimise the duration and frequency of entry into a COVID-19 room or area. This may involve the bundling of clinical activities and the use of video monitoring.

We **recommend** in ICU, that all HCWs not directly involved in patient care (e.g., dietary, administrative staff, students) where possible be excluded.

We also **recommend** that other medical teams use teleconferencing preferentially and only visit intensive care if absolutely necessary, and with the absolute minimum of staff.

If feasible, ICU staff should be rostered between clean and COVID-19 teams, with provision for standby staff.

Reduce HCW Cross-infection with COVID-19

To reduce cross infection, we **recommend** cancelling face-to-face meetings as much as possible. For meetings with operational, clinical or education value we recommend that secure video-conferencing applications are provided and utilised.

As the incidence of COVID-19 increases, there is a risk of a HCW becoming infected while caring for a patient with unrecognised COVID-19 or having contact with an asymptomatic or minimally symptomatic HCW with COVID-19. We **recommend** a staff log for staff rest areas or clinical areas be maintained to ensure contact tracing controls can be easily established if required.

We **recommend** rest and work areas be compliant with social distancing guidelines. In rest areas where compliance with social distancing is not possible, we **recommend** adjusting the physical environment to ensure social distancing.

Depending on the prevalence of community transmission, the recommendations for staff wearing surgical masks in non-clinical areas will change.

During periods of increased community transmission we **recommend** enhanced infection control measures such as the blanket use of Tier 3 PPE (N95 mask or equivalent and eye protection) in all clinical areas.

We **recommend** regular surveillance testing for staff who are working in COVID areas.

Avoid COVID-19 HCW infection from the environment

To avoid environmental cross-contamination the following is **recommended** to minimise the risk of contamination of staff via equipment:

- Avoid sharing ICU equipment and preferentially use only single-use equipment
- Minimise personal effects taken to the workplace
- Any personal devices taken into a COVID-19 area are subject to infection control cleaning as per local guidelines
- Stethoscope use should be minimised.

We **recommend** that:

- Clean scrubs are available to change into before each shift
- Staff have access to change areas and showering facilities.

We **recommend** that cleaning of clinical and non-clinical areas complies with national and jurisdictional standards for COVID-19 infection control. We **recommend** that staff providing cleaning and ancillary services are provided with appropriate training and supervision in PPE.

Robust Visitor Screening and Management

Given the stress on families with a loved one in intensive care, processes around patient visits must be communicated clearly and compassionately to visitors with an emphasis on the protection of patients, families and staff. All visitors to ICU **must** be screened for potential COVID-19 infection. Criteria for safe visitation should be based on jurisdictional public health advice, with consideration towards clinical, contact and travel history, vaccination status and evidence of a negative COVID-19 test.

If visitors are entering COVID-19 areas, we **recommend** they wear appropriate PPE consistent with airborne precautions.

We **recommend** hospitals maintain a hospital visitor log to allow for contact tracing and activity mapping of confirmed cases e.g. QR code check in system. Communication to families and visitors should include posting visual alerts (e.g. posters) at the entrance and strategic places (e.g. waiting areas, lifts) advising visitors not to enter the facility when ill.

Personal Protection Equipment (PPE)

Administrative Control Considerations Related to PPE

In ICU there is an increased risk of dispersion of aerosolised virus into the healthcare environment due to the nature of critical illness, higher patient viral load and the performance of aerosol-generating procedures. We **recommend** contact and airborne PPE precautions be used to care for all suspected or confirmed COVID-19 patients in intensive care, including the care of patients in an open cohorted ICU. We also **recommend** intensive care staff adhere to contact and airborne PPE precautions for the assessment or care of suspected or confirmed COVID-19 patients in any location within the hospital. This advice is consistent with the National COVID-19 Clinical Evidence Taskforce advice on protection of healthcare workers.

We **recommend** that all hospitals should keep a record and report staff training in PPE compliance and competency; only staff who have been trained in PPE usage should care for patients confirmed or suspected to have COVID-19. We **recommend** that there is a system in place to ensure compliance with changes in PPE recommendations.

We **recommend** *fit testing* of N95 masks. The purpose of *fit testing* is to identify which size and style of N95 is suitable for an individual. It also provides an opportunity to ensure healthcare workers are properly trained in the correct use of the mask. If staff are unable to achieve a fit test with available N95 masks, then we **recommend** the staff member be redeployed. If this is not possible due to the affected staff member performing a vital function in the ICU, then the use of PAPR could be considered.

We **recommend** minimising aerosol generating procedures (AGP) unless these are absolutely necessary. If they must be performed, then they should be completed in a negative pressure room (Class N room). If this is not available, then a single room (Class S) should be used with the doors closed.

Aerosol generating procedures (AGP) include:

- Intubation
- Extubation
- Bronchoscopy
- High flow nasal oxygen use
- Nebulised therapies
- Non-invasive ventilation (particularly with a poorly fitting mask)
- Procedures on screaming children
- Tracheostomy
- CPR prior to intubation.

There is now recognition that Aerosol Generating Behaviours (AGBs) are an important method of transmission of COVID-19 and this reinforces the need for contact and airborne precautions in the critical care environment.

Powered Air Purifying Respirators (PAPR), with appropriate training on the use of these devices, may be considered for staff protection against COVID-19. One benefit of PAPR is they do not necessarily rely on a proper seal, thus for those conducting AGP procedures the risks associated with ill-fitting N95 masks are reduced. Although expensive, some can be disinfected and reused.

The use of PAPR helmets may free up supplies of face shields and disposable N95 masks. Donning and doffing of these devices may be complex, and the risk of viral dispersal during the doffing process must be weighed against any benefit of the device. We **recommend** strong attention to be given to the correct doffing procedure if these devices are used.

Training in PPE

We **recommend** that all intensive care personnel (medical, nursing, allied health, support service staff) receive training in infection control and personal protection equipment. In order for an N95 mask to offer the desired protection, it is important that there is a correct facial fit. The two distinct procedures used to achieve this are referred to as the 'fit test' and the 'fit check'.

We **recommend** that fit checking for an appropriate mask seal be performed every time a HCW applies a new N95 mask. The manufacturer's instructions for fit checking of individual brands and types of N95 respirator should be referred to at all times. N95 masks should not require excessive manipulation to achieve a seal.

We **recommend** the use of interdisciplinary small group simulation to practice and improve COVID-19 clinical processes and staff training in PPE.

Application of PPE

We **recommend** that when a unit is caring for a confirmed or suspected COVID-19 patient that all donning and doffing is supervised by a dedicated PPE spotter to decrease staff COVID-19 infection and furloughing. The dedicated PPE spotter is a specifically trained staff member (not necessarily an intensive care staff member) whose role is to supervise donning and doffing and monitor for any breaches in PPE safety and provide education and feedback to improve performance. Where a PPE spotter is unavailable, supervision of PPE application and removal should still occur but may have to be done using a "buddy" system.

Specific recommendations for airborne precautions should follow jurisdictional infection control guidelines including fit checked N95 mask, face shield, impervious gown and gloves. In addition, the following can be **considered**:

- Hair cover for AGP
- Shoes that are impermeable to liquids.

Recurrent use of shoe covers is **not recommended** as repeated removal is likely to increase the risk of staff contamination.

Maintaining the Supply of PPE

Any strategy to successfully maintain the supply of PPE during the COVID-19 pandemic needs an understanding of current PPE inventory, current and future supply, with rational and appropriate use.

Current PPE Inventory

Uncertainty in PPE inventory and supply causes anxiety in the frontline workforce. We **recommend** a national and jurisdictional approach which is transparent. We **recommend** the establishment of a clear PPE governance structure to include transparency on current inventory and supply, an escalation process in the case of critical PPE shortages and decision-making pathways which are responsive to local demand with communication to and from frontline staff.

Coordinate PPE Supply Chain Management Mechanisms

Due to increasing international demand, sourcing a reliable supply requires the current strategies of re-establishing previous supply chains, developing new supply chains and increasing local production.

Rational and Appropriate Use of PPE

The same measures to minimise overall staff exposure to COVID-19 also reduce PPE demand. We **recommend** that all facilities implement the previously mentioned measures to minimise overall staff exposure which also **reduce PPE demand** including:

- Excluding HCW not essential for patient care from entering their care area
- Reducing face-to-face HCW encounters with patients
- Cohorting patients
- Maximizing the use of telemedicine
- Reducing the number of patients going to the hospital (e.g. for outpatient appointments)

We **recommend** prioritisation and rapid testing of intensive care patients with suspected COVID-19 to minimise the use of unnecessary PPE.

We do **not recommend** any local facility policies to pre-emptively preserve PPE that reduce the occupational health and safety of health care workers.

We do **not recommend**:

- Using face mask PPE that has expired beyond its shelf-life.
- Continuous use in consecutive patients of N95 masks with storage in a 'Ziplock' bag for next use.
- Use of repurposed equipment such as sewn fabric masks and gowns.

Gowns, gloves and disposable N95 masks are designed for single use. There is significant global interest in strategies to reuse N95 masks after sterilisation. Currently, due to a lack of evidence, these strategies are **not recommended**.

Metrics for Staff Safety (PPE)

PPE Metrics are part of clear communication directly from the hospital, the intensive care and the frontline staff.

In order to calculate intensive care PPE burn rate, we **recommend** that ICUs document and report their daily usage of:

- N95/P2 face masks
- Surgical face masks
- Long sleeve impermeable gowns
- Face shield/goggles.

We **recommend** that hospitals should, on a daily basis, estimate the number of days of PPE supply that is available for current patient load, aiming to maintain a supply to last for more than 7 days. We **recommend** that if a hospital has a critically low PPE supply anticipated to last less than 3 days, that a jurisdictionally defined alert state be activated, including immediate escalation to the hospital Chief Executive Officer and the relevant State Coordination body. Remote, rural and regional centres will need to factor in extra days for a resupply, as compared to a metropolitan centre.

Special Situations for Staff Safety in COVID-19 Patients

Airway Management

We are aware of multiple comprehensive guidelines for airway management in COVID-19 patients and we **endorse** the Safe Airway Society consensus statement on Airway Management and Tracheal Intubation in COVID-19 patients. We **recommend** the following principles for intubation of a proven or suspected patient with COVID-19 to minimise HCW infection:

- Intubation should preferentially be performed in a negative pressure room (Class N) or if not available then a single room should be used (Class S).
- We **recommend** airborne PPE precautions for all staff in attendance including:
  - Fit checked N95 mask
  - Face shield
  - Impervious gown
  - Gloves
- The procedure should be performed by the most qualified available staff with the minimum number of healthcare personnel present as are required to undertake a safe intubation
- Video laryngoscopes should be used preferentially, and staff should be trained and familiar with these devices
- To reduce aerosol generation staff should consider:
  - Optimising pre-oxygenation to reduce the need for rescue interventions
  - Use of a viral filter on bag mask circuit
  - Minimising the need for bag mask ventilation unless there is significant hypoxia or acidosis
  - Initiating positive pressure ventilation only after confirming that the endotracheal tube cuff is inflated and after ensuring that an appropriate filter and waveform capnography device is in place.

Extubation

We recommend the following principles for extubation of a patient with COVID-19 to minimise HCW infection and improve outcome and safety:

- Extubation should ideally take place in a negative pressure room.
- Minimise the number of staff in the room, with staff available outside the room for emergencies.
- Staff should observe airborne precautions, with appropriate PPE, at all times.
- Adequately trained staff for re-intubation should be available.

Failed extubation in COVID-19 patients is potentially a high risk situation for HCW infection. Consideration should be given to optimisation of clinical status, spontaneous breathing trials and time of day for extubation to ensure the best possibility of a successful extubation and availability of senior staff if re-intubation is needed.

Percutaneous Tracheostomy

Tracheostomy is often required to facilitate weaning from mechanical ventilation. The benefits of the procedure need to be balanced against the risk to health care workers posed by performing this aerosolising procedure. We are not aware of any evidence to guide the ideal timing of tracheostomy in COVID-19 patients, however we would **recommend** that tracheostomy should not be performed before 10 days of mechanical ventilation.

Cardiopulmonary Resuscitation

The recommendations pertaining to the organisation of rapid response teams are discussed in the Pandemic Planning section under **Critical Care Outreach and Rapid Response, Medical Emergency and Code Blue Teams.**

Cardiopulmonary resuscitation is considered an aerosol generating procedure and appropriate PPE should be worn by healthcare staff. We **recommend** hospitals review their approach to cardiopulmonary resuscitation (CPR) on the ward, for patients with COVID-19, as well as for the general ward population during periods of increased community transmission.

We **endorse** the National COVID-19 Clinical Evidence Taskforce Guidelines for Cardiopulmonary Resuscitation.

Post Exposure Management

It is **recommended** every observed breach in PPE usage is recorded in the incident management system as an occupational health and safety risk. ANZICS **recognises** that breaches will occur despite best efforts and no blame should be apportioned to the individuals involved.

If an exposure or breach of PPE occurs, assessment and risk categorisation of the staff member should be done in accordance with national guidelines and local policy. Based on risk of exposure the appropriate further management should be commenced immediately including a quarantine/self-isolation period. We recommend staff should be provided with funded accommodation if they are unable to self-isolate in their own home.

For either staff illness or post exposure management we **recommend** the provision of adequate psychosocial support for the staff member during quarantine or for the duration of their illness. On return to work a refresher infection control and prevention training should be offered for the staff member.

Nosocomial Health Care Worker Infection

We **recommend** that each nosocomial health care worker COVID-19 infection is entered into the local and jurisdictional incident management system as a notifiable major incident.

We **recommend** that each COVID-19 HCW infection is independently reviewed with adjudication of source and the mechanism of infection. A multi-incident analysis should identify the preventable factors and system changes to decrease HCW infections.

Staff Wellbeing

Psychological Needs of Healthcare Staff

During the COVID-19 pandemic, health care professionals face a rapidly evolving practice environment that differs greatly from what they were trained in. Preparing for and managing a surge in critically unwell patients has changed the way we work and interact as a team. There are societal shifts and emotional stressors faced by all people. In addition to this, ICU staff face greater risk of infection exposure, extreme workloads and moral dilemmas.

All ICU staff will experience an increased workload with heightened anxiety both at work and at home. ANZICS **recognises** that care of ICU staff is an important consideration to maintain sustainability and ensure we have a workforce after the pandemic has ended. The psychological needs of healthcare staff are described in **Table 1**.

Table 1: Psychological Needs of Healthcare Staff

Preparation Phase	Active Phase		Recovery Phase
Anticipatory Anxiety	**Heroics and Surge to Solution**	**Disillusionment and Exhaustion**	**Recovery and long-term psychological impacts**
Rapid planning, anticipatory anxiety about the unknown Many staff feel unprepared in this stage	Increased camaraderie Sense of rising to the challenge. More prone to error as find it hard to see the options Frustrations and role confusion as people try to adapt too quickly to new designs and roles Disagreement about the sense of urgency Staff lose usual boundaries over working hours and breaks Work-life tensions, family life unsettled Social norms and niceties slip and behavioural responses increase Focus of 'getting things done' impacts communication	Period of highest psychological risk Adrenaline is high and staff on auto pilot due to exhaustion Self-care may be neglected Moral distress and injury are a risk Emotional disconnection from work with compassion fatigue Tensions at home may escalate Cumulative stress Staff with pre-existing vulnerabilities need monitoring	Staff have time to reflect Most staff will cope successfully using their own preferred style, individual resources, and social supports Many may be changed in positive ways with post traumatic growth Some may experience intrusive thoughts about what should have been done differently and have guilt and shame Dissonance with a hero narrative may make this harder to disclose problems and may exacerbate distress Some may feel resentment toward their job, individuals and the organisation Some staff may be at risk of burnout or PTSD

Risk Factors for Psychological Stress

ANZICS recognises the following contributory factors to psychological stress in ICU staff:

- Being unable to meet basic physiological needs such as access to food, water, adequate rest, and time to toilet as a result of PPE or restrictions/ increased activity at work or at home
- Restrictions to social activities and being unable to see family and friends due to non-pharmaceutical interventions in the community
- Perceiving that they are a potential health risk to their family and friends
- The need to quarantine due to COVID-19 exposure at work or in the community
- Feeling unprepared or untrained to perform the duties expected for the role (particularly for staff working in an unfamiliar environment or beyond their normal skill level)
- Having been conscripted to work in an area of risk rather than volunteering to do so
- Moral distress due to visitor restrictions and difficulty in communicating with family and friends of patients
- Restricted resources and the need to triage or reallocate healthcare provision, with a perceived inability to provide best practice and compassionate care to patients
- Mistrust in the organisational infection control processes
- Poor communication pathways within healthcare organisations.

Impact of Stress and Anxiety

Stress and anxiety in healthcare staff can present in many ways (**Table 2**). It is important during a pandemic that we normalise heightened emotions and feelings of anxiety and stress. Leaders must acknowledge this anxiety before providing strategies to manage it.

The potential sequelae of increased stress and anxiety in healthcare staff is wide-ranging and includes:

- Increased staff turnover
- Poor staff retention
- Increased sick leave and absenteeism
- Reduction in working hours
- Adverse work culture
- Increased risks to patient safety
- Poor quality patient care.

ANZICS **recognises** that staff who are required to quarantine during COVID-19 are at increased risk of acute stress disorder and other poor psychological health outcomes. Staff often feel a strong sense of guilt about being in quarantine, particularly if they are aware their colleagues are suffering or understaffed, and this can lead to moral distress. For some staff going into quarantine may lead to a fear of work, a desire to resign or ongoing avoidant behaviour of work or crowded areas.

ANZICS **recommends** that staff who are required to go into quarantine receive regular communication and support. Boredom, isolation and loss of routine are risk factors in quarantine.

Table 2: Impact of stress and anxiety on ICU staff

Impact	Consequence
Psychological	Dreams, nightmares, recurrent images and flashbacks, inability to critically think or focus, low concentration, rumination, forgetfulness, amnesia, insecurity, indecisiveness, loss of control, loss of humour, denial, distorted cognition, hyperarousal, lack of interest in daily life, sensitisation, unrealistic expectations, increased awareness of own losses, intrusive thoughts, reduced response rate
Emotional	Poor job satisfaction, reduced self-image, confidence, shame, guilt and failure, grief, powerlessness, helplessness, irritation, crying, panic, unable to conceal emotions, effect on human connection, deep sense of woundedness, regret, anger, futility, hopelessness, emotional suppression, increased vulnerabilities, low morale, loss of compassion, apathetic, frustration, loss of empathy, cynicism, sadness, feeling frightened or helpless
Behavioural	Disengagement, feeling isolated and withdrawn, decreased productivity or task performance, avoidance behaviours, rigidity, harshness, hostility, hyper-reactivity, smoking, drinking alcohol, blame, self-preoccupied, fantasising, wishful thinking, poor professional attitude, habituation, silencing, reduced commitment, violence, anxiety, less effective teamwork, comfort eating or lack of appetite
Physical	Fatigue, exhaustion, tiredness, lethargy, restlessness, stomach-ache, nausea, headache, pain, sleep disturbed, increased heart rate, difficulty concentrating, changes to appetite

Strategies to improve staff wellbeing

It is important that ICU staff recognise stress and anxiety in themselves and adopt strategies for the maintenance of mental and physical wellbeing (**Table 3**). Health care workers are self-reliant and often reluctant to reach out for help.

Table 3 - Strategies for ICU staff to support and care for themselves

Understanding the facts	Caring for yourself outside of work	Staying connected
Normalise emotions: a level of distress and anxiety is normal given the constant change and challenges Limit exposure to the constant streams of news and social media Seek information from trusted and practical resources Distinguish facts from rumours and misinformation Beware of dramatic language, this might panic colleagues or reinforce fear in oneself. Keep things in perspective and stay calm. Develop a process of self-check-in. Monitor yourself for symptoms of depression or a stress disorder, such as prolonged sadness, difficulty sleeping, intrusive memories or hopelessness Develop skills in asking for help	Maintain your health, through eating good natural foods, drinking water, ensuring sufficient rest between shifts and regular exercise Exercise can be challenging during lockdown. Use apps and social media to find creative ways to move Reconnect with music and books, movies and podcasts Use strategies to de-stress that have worked for you in the past. Reflect on these when feeling well, write them down & store away in a place that you will access and refer to when feeling less well Find time to connect with nature, such as fresh air through an open window if you are unable to get outside Avoid using unhelpful coping strategies such as smoking, alcohol or drugs to alleviate your stress Take a break from tending to patients & allow yourself to do something unrelated to work that you find comforting, fun or relaxing Create something and focus on some of the activities we can still do such as baking, craft or finishing a home project	Stay connected with your friends and family via email, social media, video conference and telephone. They are an anchor of support outside the healthcare system Turn to colleagues, managers or other trusted persons for social support – many may be feeling similarly to you Treat colleagues with compassion, acknowledge each other's fears and encourage each other to openly discuss vulnerabilities Try to maintain your humour amidst the chaos Connect with colleagues to share stories of success, rather than focusing on failures and stresses Recognise your colleagues, formally or informally for their service Contribute, showing care towards family, friends or vulnerable people in the community, which can foster a sense of hope, purpose and meaning

ANZICS recommends that leaders maintain an awareness of the strategies they can use to monitor and support staff wellbeing during the pandemic and that this is reviewed regularly. Organisational support for ICU staff wellbeing during the pandemic is paramount.

In **maintaining the health needs** of the workforce, ANZICS **recommends**:

- That units/hospitals provide meals and drinks for frontline staff to boost morale and minimise staff leaving the hospital for meals
- The provision of rest breaks and rest areas compliant with social distancing guidelines
- Access to clean showers and change areas after a shift before returning home. The option to wear hospital scrubs allows staff to feel "decontaminated" as they change clothes before returning home
- Access to psychological support with clear messaging on where to receive this support
- Providing education and resources to support psychological health
- Rostering of shifts sympathetic to the needs of the workforce, that may need to change during a more protracted pandemic response. This may include shorter shifts, smaller work areas/pods, limiting exposure to high-risk zones, and rostering adequate time off between shifts.

In aiming to improve **staff safety**, ANZICS **recommends**:

- Providing sufficient senior oversight during a shift to feel supported in the provision of clinical care
- Using buddy and mentor systems to support less experienced and more anxious staff Partnering less experienced staff with more experienced staff and for ICU-trained staff to be available to supervise non-ICU trained staff
- Regular briefings/huddles of staff to provide an opportunity for a "check in" (are you OK?), give an overview of the ICU and any pressures/concerns, update any changes in workflow, policies or procedures, and provide PPE refreshers
- Staff should be able to take sick leave without fear of reprisal and be supported and encouraged to raise concerns and fears with clinical leaders. Modelling of this behaviour by leaders themselves is very powerful.

In supporting the need for staff to belong and to improve **communication**, ANZICS **recommends**:

- That leaders should be visible and have a communication strategy that provides staff with the important information that will impact on their care of patients and themselves
- Direct information provision by managers/clinical leaders in the ICU rather than through executive/ hospital/health directorate levels
- Creating space for reflection to process the experience, including regular debriefing opportunities with the whole team. These can be both formal and informal
- Developing processes to introduce and welcome new staff members to the team. Regular communication pathways/newsletters may include a "getting to know you" section to facilitate this
- Visible leadership with a communication strategy that provides staff with the important information that will impact on their care of patients and themselves

In aiming to **promote esteem and respect,** ANZICS **recommends**:

- Providing small tokens of thanks and gratitude such as chocolate, coffee vouchers, hand creams, as well as verbal acknowledgement and gratitude each day
- Providing relevant and timely feedback to staff to demonstrate that their work and activities have been noticed.

Appendix 1

Levels of Critical Care Capability in Remote, Rural and Regional Areas

Health Care Facility / Hospital	Resources available
Hospitals with an intensivist led/staffed ICU who regularly provide the full range of critical care support but lack on-site access to the full range of sub-speciality support.	• ICUs accredited with the College of Intensive Care Medicine.
Hospitals with an ICU led/staffed by non-Intensivists who regularly provide critical care support with the occasional assistance of a larger centre.	• Staffed by medical, nursing and allied health critical care personnel with intermittent or regular transient or remote support from a FCICM. • Can extend to intermediate-term ventilatory support capabilities (e.g. in Emergency Department, HDU, ICU or operating theatres) depending on clinical space and engineering. • Less variable critical care staffing mix who may or may not have other clinical duties and may require additional external support. • Usual remote critical care support is through established telehealth or critical care retrieval services.
Hospitals with established Emergency Departments, HDUs or theatres who regularly provide critical care on a short term basis.	• Staffed by medical, nursing and allied health generalists, including remote area nurses, advanced practitioners, anaesthetists, general practice anaesthetists, emergency department physicians and rural hospital generalists. • Short term ventilatory support capabilities (e.g. in operating theatres). • Variable critical care staffing mix on a shift-by-shift basis. • Remote critical care support is usually through critical care retrieval services.
Hospitals with none of the above.	• Limited capacity to provide any critical care support.

Appendix 2

Checklist for ANZICS "Planning for a Pandemic" Guideline

Minimising ICU Demand	✔
ANZICS recommends	
Deferment or cancellation of non-urgent elective surgery. Protocols and mechanisms should be established for a staged, progressive cancellation of elective surgery.	◯
Developing cooperative agreements with other health services. Discussions with other health services (e.g. private hospitals) should be held to facilitate the transfer and care of appropriate patients.	◯
Identifying alternative areas for patient monitoring. Alternate areas capable of providing a higher level of monitoring should be identified.	◯
Increasing ICU Capacity (Space)	✔
ANZICS recommends	
Identifying alternative areas with the physical infrastructure for the care of critically ill patients. Areas with the capability to care for non-ventilated or ventilated patients should be identified early, together with processes to enable expeditious repurposing for ICU utilisation.	◯
Quantifying stock of equipment, including consumables and disposables, and identifying appropriate channels for procurement and storage.	◯
Reviewing ICU and Organisational Discharge Processes. Mechanisms and processes should be established to facilitate safe discharge of patients from ICU during a surge in demand, together with organisation-wide efforts to improve patient flow.	◯
Increasing ICU Capacity (Workforce)	✔
ANZICS recommends	
Identifying nursing staff capable of caring for critically ill patients. Nurses from a variety of backgrounds may be redeployed to the ICU under the supervision of experienced ICU nurses.	◯
Developing a rapid ICU orientation programme for nurses. Nurses being redeployed to the ICU would need to undergo a rapid orientation program in order to facilitate their transition into the critical care environment.	◯
Identifying medical staff who can be suitably redeployed from other specialties.	◯
Identifying allied health staff who can be suitably redeployed to the ICU. Additional physiotherapists, pharmacists and social workers would be required to support the care of critically ill patients and their families.	◯

Increasing ICU Capacity (Workforce) *continued*	✔
ANZICS recommends	
Streamlining administrative on-boarding processes. Standard protocols need to be rationalised and streamlined to facilitate efficient onboarding of new staff members.	◯
Preparing strategies to maintain staff morale. Providing support through a variety of means (e.g. psychological support, accommodation) is imperative to maintain staff morale.	◯
Effective communication	✔
ANZICS recommends	
Establishing an information management plan. Methods of efficient dissemination of new information should be established, utilising a variety of platforms.	◯
Identifying and maintaining key lines of communication. Key stakeholders and methods of communicating with them must be established to respond rapidly to a surge in clinical demand.	◯
Developing a strategy for decision-making about ICU admission	✔
ANZICS recommends	
Ensuring ICU medical staff have a shared decision-making model. Senior ICU medical staff should have discussions on developing a common approach to decision-making regarding ICU admissions and treatment.	◯
Rural and Regional ICUs	✔
ANZICS recommends	
Plan for workforce shortages and expand telehealth services.	◯
Nominate a local COVID-19 leadership group.	◯
Management of the deteriorating patient	✔
ANZICS recommends	
Reviewing Rapid Response (RRT)/Medical Emergency Team (MET) models. Alternative RRT/MET models involving delegation of roles to non-ICU services should be explored.	◯
Ensuring all patients have a goals of care (or equivalent) form completed with an appropriate plan for escalation of treatment.	◯
Facilitating Emergency Department Management	✔
ANZICS recommends	
Early referral to ICU to facilitate emergency department flow.	◯

Appendix 3

Checklist for "Staff Safety and Sustainability" guideline

Infection control measures (engineering)	✔
ANZICS recommends	
Developing a plan for patient isolation and cohorting This includes identifying all appropriate Class N and S rooms, and a plan for cohorting of patients once these rooms are exhausted.	◯
Infection control measures (administration)	✔
ANZICS recommends	
Ensuring all patients are screened and tested in line with national recommendations	◯
Maintaining a record of PPE training, compliance and competency Only staff who have been appropriately trained should be allowed to care for patients with COVID-19.	◯
Monitoring health care worker infection and PPE breaches A process for monitoring these sentinel events in infection control should be established.	◯
Managing ICU visitors A process for limiting and screening visitors and maintaining a visitor log.	◯
Performing fit-checking for N95, and fit-testing where possible All personnel should be educated in the fit checking of N95 masks.	◯
Minimising cross contamination and fomite transmission A clear policy on the use of personal effects and other potential fomites should be established.	◯
Maintaining staff wellbeing	✔
ANZICS recommends	
Identifying measures to provide social support to staff Social disruptions such as school closures may affect staff ability to attend work, and measures to mitigate their impact should be considered.	◯
Addressing food and other issues The availability of scrubs, shower facilities and meals/drinks reduce staff burden, whilst minimising the risk of community spread.	◯
Developing policies for staff illness, and post-exposure management A protocol for managing and testing staff who may be infected with COVID-19.	◯
Identifying and redeploying high-risk staff Staff at higher risk of complications from COVID-19 should ideally not enter COVID-19 areas.	◯
Practicing safe airway management	✔
ANZICS recommends	
Developing a local policy for airway management of patients with COVID-19 Airway guidelines should address the issues of how safe airway management can be achieved.	◯

Appendix 4

CDNA risk matrix for COVID exposure

		Exposure			
		Aerosol generating procedures	Close contact (See Close contact definition)	Environmental contamination and/or working in COVID-19 treatment or testing facility	Casual contact (contact not meeting the Close contact definition)
Contact PPE	**No PPE**	High risk	High risk	Conduct individual risk assessment	Conduct individual risk assessment
	Surgical mask only	High risk	High risk	Conduct individual risk assessment	Low risk
	Mask and eye protection only	High risk	Conduct individual risk assessment	Conduct individual risk assessment	Low risk
	Other PPE concerns e.g. incorrect	High risk	Conduct individual risk assessment	Conduct individual risk assessment	Low risk
	Appropriate PPE as per latest guidance	Low risk	Low risk	Low risk	Low risk

High risk	**Low risk**
• Quarantine for 14 days as a close contact • Test if symptomatic at any time • Test upon entry or exit to quarantine as per jurisdictional practices	• Test and isolate until result received • Continue to work if negative • Health or residential care worker to be alert to mild symptoms • Test only if symptomatic or as part of outbreak response

Appendix 5

Useful patient and family information leaflets and resources for post ICU care

Topic	Source
Post COVID-19 Patient information pack	NHS Homerton University Hospital https://www.homerton.nhs.uk/download/doc/docm93jijm4n6743.pdf?amp;ver=17638
COVID-19 Long Term Effects (CDC patient information resource)	https://www.cdc.gov/coronavirus/2019-ncov/long-term-effects.html
Post intensive care syndrome - explanation for consumers	https://youtu.be/T03palv4mYU https://www.sccm.org/MyICUCare/Home
Post ICU Presentation Screening Tool (PICUPS) self-reporting tool for patients and their families	https://www.ics.ac.uk/Society/Guidance/PDFs/PICUPs_Community
Caregivers information and support post COVID-19	https://www.carersaustralia.com.au/coronavirus-information/caring-advice/ https://medicine.umich.edu/dept/pt-experience/patients-families/covid-19-resources-patients-families https://www.relationships.org.au/
Relationships Australia	https://www.relationships.org.au/
Information sheets for mental health problems - anxiety, depression, sleep, unhelpful thinking styles	https://www.cci.health.wa.gov.au/Resources/Looking-After-Others Guidance for patients and how carers can help (long doc) https://deepblue.lib.umich.edu/bitstream/handle/2027.42/163715/Workbook_8_RecoveringAtHome_V1.1.1.pdf?sequence=17&isAllowed=y
NDIS (National Disability Insurance Scheme)	Am I eligible and how to apply: https://www.ndis.gov.au/applying-access-ndis/am-i-eligible
MyAgedCare (support services at home for 65yo and over)	How to find the right aged care support services https://www.myagedcare.gov.au/

Appendix 6

Resources for Staff Wellbeing section

General Information / Articles / Webinars

- CICM website: www.cicm.org.au (under Resources)
- Australian Government Resources: www.headtohealth.gov.au
- WHO Resource: www.who.int/covid-19/mental_health
- Black Dog Institute: www.blackdoginstitute.org.au
- Australasian Doctor's health network: www.adhn.org.au
- Doctors4Doctors: www.drs4drs.com.au
- Mental Health Resources for Crises https://psychiatry.ucsf.edu/copingresources/covid19
- Smiling Mind https://www.smilingmind.com.au/smiling-mind-app
- The Resilience Project https://podcasts.apple.com/au/podcast/coronavirus-our-mental-health/id1476501557?i=1000470382188
- Treat Healthcare https://treathealthcare.com.au/
- Face COVID - Responding to the Corona Crisis https://services.unimelb.edu.au/__data/assets/pdf_file/0004/3332227/FACE-COVID.pdf ; https://www.youtube.com/watch?v=BmvNCdpHUYM
- Going home checklist https://learn.nes.nhs.scot/29485/allied-health-professions-ahp-learning-site/supporting-the-wellbeing-and-mental-health-of-yourself-your-team-and-others/going-home-checklist

Contacts

Australia:

1) Lifeline Australia: 13 11 14
2) Beyond blue: 1300 22 4636
3) Australasian Doctor's Health Network:
   ACT: 02 9437 6552.
   NSW: 02 9437 6552
   QLD: 07 3833 4352
   VIC: 03 9495 6011
   WA: 08 9321 3098
   SA: 08 8366 0250
   NT: 08 8366 0250
   TAS: 03 9495 6011

NZ:

1) Free call /Text: 1737
2) Lifeline NZ: 0800 LIFELINE / or free text 4357
3) Suicide Crisis Helpline: 0508 TAUTOKO
4) Healthline: 0800 611 116

Appendix 7

Data Management Summary and Recommendations

Metrics and Data Monitoring

Considerations in Pandemic Planning

ANZICS recommends

- Adherence to the standard principles of data collection, security, storage and use of data remain of paramount importance. Data collection should occur within existing approvals.
- Collection of data be prioritised and recommend this is performed by dedicated trained staff with appropriate funding
- Metrics and data monitoring processes established during the pandemic should be integrated into the health service on a permanent basis with dedicated government support and funding
- Implementation of procedures to ensure data is monitored and establishment of a reporting system so that analysed data can be interpreted and actioned by relevant bodies/authorities
- Data should be made available to stakeholders to allow benchmarking, comparison and future health care planning at local, jurisdictional and national level
- Aggregated reports be made freely available to all, including the general public

Data Collection

ANZICS recommends

- The collection of data in 3 broad groups; Intensive Care, Individual Patients and Staff
  - Intensive Care
    - should include operational and system-planning data by means of real time data and in-depth snapshot survey
  - Individual Patient
    - should include a minimum dataset about demographics and outcomes of all ICU patients in addition to epidemiological information about COVID-19 patients
    - inclusion in both observational and interventional clinical trials
  - Information about staff
    - should include data related to workload, wellbeing , risk minimisation and COVID-19 exposure and infection
- These data sets evolve to keep pace with scientific knowledge and changes within the healthcare service

Reporting and Usage

ANZICS recommends

- That aggregated reports be freely available to all, including the general public

Links to listed databases:

ANZICS CORE Adult Patient Database – https://www.anzics.com.au/adult-patient-database-apd/

ANZICS CTG Point Prevalence Program – https://www.georgeinstitute.org/projects/point-prevalence-program

ANZICS Critical Care Resources Survey – https://www.anzics.com.au/critical-care-resources-ccr-registry/

ANZICS Surge Survey – https://www.mja.com.au/journal/2020/212/10/surge-capacity-intensive-care-units-case-acute-increase-demand-caused-covid-19

CHRIS – https://chris.health.gov.au/#!/portal/home

SPRINT-SARI (ANZICS endorsed research page) – https://www.anzics.com.au/current-active-endorsed-research/sprint-sari/

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