Preparing ICUs for COVID-19: an Australian experience

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In this article, we describe the response from our intensive care unit (ICU) within a large tertiary private metropolitan Australian hospital. We hope this information may be useful to other ICUs in Australia, for any second wave of coronavirus disease 2019 (COVID-19), and for any future pandemics.

In early March 2020, the ICU medical staff leadership group began to simultaneously develop and implement training, strategies and processes within the ICU in an attempt to best prepare for the pandemic. At that point, we expected a significant increase in COVID-19 ICU admissions to occur in early April and did not receive our first confirmed COVID-19 patient with respiratory failure to the ICU until 28 March 2020. Table 1 describes our broad principles of unit preparation.

**Table 1. Principles of preparation**

**Suggested principles for ICU preparedness for COVID-19**

1. Plan a tiered response
2. Use existing and new communication channels for staff
3. Avoid working in silos
4. National guidelines to guide practice
5. Embed principles of guidelines in simulation training activities

We set about a tiered response with an early focus on infrastructure, staff education, new equipment and establishing personal protective equipment (PPE) supplies. It was planned to use multiple communication channels (eg, WhatsApp, email, Zoom for video-conferencing, and Slack for file sharing) to aid in rapid communication to staff and file sharing, and to seek out early collaboration with our emergency and anaesthetic departments to develop policies and implement education together to ensure a consistent message to staff. The positive impact
that a number of practitioners on both our emergency and anaesthetic departments have had on our ICU and the wider hospital has been immeasurable.

By late March, we had completed a full refurbishment of the adjoining paediatric ward into a second ICU, with negative pressure ventilation and installation of new ventilators. This saw an immediate increase in our existing ICU from 16 beds/rooms with 12 ventilators into a unit with 26 ventilated beds/rooms divided into two separate functioning “pods”. This process required rapid communication and collaboration with multiple departments within the wider hospital, most notably the engineering, hospital administration, and infection control teams. The most challenging task was the expansion of the staff rosters (and junior and senior medical staff) to support the expanded intensive care capacity, which included full-time equivalent calculations. All specialists who had worked in the unit in the previous 5 years but were now practising outside of intensive care medicine (eg, hospital administration or anaesthesia) were contacted to return to the unit in a clinical role. All registrars/trainees on our casual roster (who work when our full-time trainees are on leave) were contacted to increase their commitments. Partner public hospitals were also contacted to request secondment of any available trainees from their anaesthetic departments. These requests were done early and often ended in staff not being available to leave their contracted duties at their primary health service. However, we had some success and were able to expand both medical rosters to some extent.

By late March 2020, the Australian Government announced a significant reduction in elective surgery, indirectly reducing the work available to hundreds of Victorian anaesthetists. We sent out an email expression of interest to these specialists to help boost our senior medical staff roster. We received enough volunteers to complete a medical roster capable of providing safe care to our expanded ICU capacity under supervision of our intensive care medical team. Equipment was ordered in early March to meet the calculated needs of the expanded ICU. This included new ventilators and dialysis machines, consumables (such as continuous positive airway pressure helmets, endotracheal tubes and viral filters), disposable videolaryngoscope blades and a new videolaryngoscope. Designated packs for intubation were then assembled to add to airway trolleys.

Staff education was an early focus in our unit preparation. Training of staff was planned to focus on staff safety, both interprofessional and interdepartmental, and to increase awareness of new national guidelines as they were released (here and here). Much was simulation-based and included daily repeated education sessions on both a standard intubation process and PPE “donning” and “doffing” policies. We then introduced prone ventilation education. Simultaneous and identical education sessions were established in the emergency and anaesthetic departments following a brief “train the trainer” model. Resources were shared between the three departments, and clinical processes and policies were agreed upon early. Educational videos were also made and disseminated among the staff of all three departments. These were also shared with other local hospitals for their use and dissemination, hoping to achieve a consistent standard of practice.

In our opinion, this collaboration with both clinical departments within in our hospital and ICUs in other local hospitals substantially improved our unit preparation. The avoidance of working in silos, the sharing of resources (including drafts of policies under review) and the ability to open up staff education sessions to members of all departments significantly reduced our workload and anxiety.
Staff welfare was also considered during the process. Most notably through the introduction of new debriefing sessions, made available to all staff in the ICU, run by an independent facilitator and accessible to staff by videoconferencing.

**Table 2. Steps of ICU preparation of COVID-19**

Expansion of workforce (JMS, SMS) and models of care:
- refurbishment of clinical areas to expand ICU
- recruitment of staff
- dedicated staff screening area (not in ICU)
- sustainable roster designed
- recruitment of specialists from other specialties (eg, anaesthesia)

Training of staff:
- daily interprofessional, interdepartmental
- based upon national guidelines
- intubation process, donning/doffing, prone ventilation

Ensure staff safety:
- PPE (monitoring stockpiles, sensible use, trial of sterilising reusable equipment)
- negative pressure rooms
  - consultation with engineering department
  - procedural processes

Collaboration:
- sharing of policies and education resources
- within hospital:
  - emergency and anaesthesia departments
  - respiratory physicians
  - infectious diseases physicians
  - cardiologists
- outside hospital:
other large local tertiary hospitals

professional bodies/colleges (eg, the Australian and New Zealand Intensive Care Society):

i. data collection for national database to inform local practice

ii. trial site for statewide COVID-19 incidence specific dashboard

iii. practice guidelines to guide our management

Communication:

· hospital executive, administration and board (daily)
· infection control team (daily)
· Victorian ICU directors’ group (weekly)
· ICU senior medical staff meetings (twice weekly)
· strict visitation policy

Reducing non-essential workload:

· Division of COVID-19 portfolios among senior staff:
  o staff education, staff welfare, clinical protocols, PPE.
  o suspension/backfilling of all non-COVID-19 non-clinical duties
  o for example, university roles, teaching commitments, non-essential research

Funding for new equipment:

· government, private donors

PPE was identified early as a source of staff anxiety. We decided to continually share national guidelines on its use, increase PPE education and look into preservation of stockpiles. Cognitive aids for PPE donning/doffing and intubation were produced, laminated and pre-positioned in clinical areas. Infection control teams helped oversee these processes and trialed effective sterilisation of disposable eyewear and videolaryngoscope blades. Finally, significant funding was required to expand the unit. This was sought with the help of hospital administration, and we are grateful for the generosity of private donors to purchase equipment, and government funding to support increased staff costs.

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