COVID-19 HOSPITAL PHARMACY CAPACITY SNAPSHOT SERIES

FINAL REPORT

MAY 2020

Over five consecutive weeks in April-May 2020, the Society of Hospital Pharmacists of Australia (SHPA) surveyed members regarding medicines on-hand, supply from pharmaceutical wholesalers and manufacturers and hospital capacity and workforce issues in order to gain insights into hospital pharmacy operations in the early stages of the national response to the COVID-19 pandemic. Two hundred and seventy-two responses were received. While snapshot reports were provided each week to the Therapeutic Goods Administration (TGA)'s Medicines Shortages Working Group, a final report, including recommendations, is hereby provided. Not all information gathered is discussed in this report.

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1. Summary of key issues

SHPA's first COVID-19 Hospital Pharmacy Capacity Snapshot ('capacity snapshot') was produced on Friday 17 April 2020, the week after the release of Federal Government modelling which predicted a total of three million COVID-19 cases in Australia, resulting in 20,000 hospitalisations requiring 5,000 ICU (ventilator capable) beds.

Despite effective governmental cooperation on procurement of ventilators and personal protective equipment (PPE), hospitals were left to compete for medicines necessary to support the treatment of COVID-19 patients on the open market. With no visibility of available stock from wholesalers, or their place in the customer queue, pharmacy departments attempted to procure stock of critical medicines to support the full capacity called for in their jurisdictional preparedness plans.

Given that typical hospital medicines procurement aims to carry a minimal inventory, this shift to procurement driven by the need to prepare for an impending pandemic demonstrates a substantial change in strategic demand for medicines. It replaces the 'just in time' model – through which hospitals carry minimal stock (often restocking several times per week) – with a 'preparedness' model, whereby hospitals or hospital networks seek to hold enough medicines to treat a significantly larger number of patients concurrently. The need for a shift in gears towards a 'preparedness' model was elicited from Directors of Pharmacy, who were called upon by their hospital management and jurisdictional health departments to implement action plans which included the establishment and support for an increased number of ventilator-capable ICU beds. For these plans to be activated hospitals required medicines to be 'on-hand'.

Our results demonstrated that Directors of Pharmacy were unable to implement jurisdictional preparedness plans effectively, flagging key concerns about the robustness of the medicine supply chain in Australia. Given the well-known challenges of medicine supply during non-pandemic times and a reliance on manufacturing in Europe and China, Directors of Pharmacy predicted early that medicine shortages would be exacerbated by a global pandemic. Our reports indicate that hospitals acted responsibly, ordering only enough stock to meet their hospital's preparedness plans (sometimes less) and continuing to order when deliveries were not met as requested. Although it was widely understood that strategic medicines reserves did exist in some jurisdictions, Directors of Pharmacy were largely unaware of specific information such as their actual or intended extent, and their ability to be accessed if needed.

With consistent responses nationally, ranging from forty-five (45) to sixty-six (66) hospitals (272 in total), hospitals remained highly engaged with this topic across the snapshot period (17 April to 15 May).

While stocks of propofol increased over the survey period, access to neuromuscular blockers remained acutely uneven and generally insufficient should a significant second surge of COVID-19 cases emerge. This will be a key concern over the next six months as elective surgery resumes and the possibility of a surge remains with lifting of containment measures.

SHPA's five surveys capture the high level of concern held by hospitals as they endeavoured to support jurisdictional preparedness planning. In addition, hospitals held concerns about the impact of the

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pandemic on their workforce and their ongoing capacity to procure and manage stock daily if the workforce was reduced as projected. This was particularly pertinent for regional and rural hospitals.

When considered in relation to preparedness plans implemented by the jurisdictions, hospitals are still unable to access sufficient medicines to meet expectations. This highlights the fragility of the 'just in time' model. The uncertainty experienced by hospitals during this pandemic period may result in an ongoing change in demand for medicines as hospitals and jurisdictions place greater priority on certainty of medicines availability in times of emergency.

2. Key points

- Jurisdictional plans required a broad range of hospitals to increase their number of ventilator-capable beds by up to two hundred and fifty per cent (250%) and to have medicines 'on hand' to support these.
- While awareness of jurisdictional strategic medicines reserves was common among Directors of Pharmacy, there was little understanding of their actual or planned extent, leading to a lack of confidence in the ability to call upon such reserves if cases were to surge.
- Hospitals continue maintaining larger numbers of ventilator-capable ICU beds than in the pre-COVID era, and orders for critical medications have been in line with this requirement. SHPA did not find evidence of hoarding or stockpiling at the hospital level.
- Fifty-one percent (51%) of hospitals who participated in this snapshot have admitted patients with confirmed diagnoses of COVID-19 for treatment in either a High Dependency Unit (HDU) or ventilator-capable ICU bed.
- Fifty-seven percent (57%) of hospitals that had managed COVID-19 patients were in metropolitan areas, thirty-seven per cent (37%) in regional areas and six per cent (6%) in rural/remote locations.
- Medicines were not supplied as ordered to hospitals who have been managing COVID-19 patients in their HDUs and ICUs.
- Hospitals in regional, rural and remote locations continue to be less confident in their access to medicines and report greater difficulty in having orders filled.
- Hospitals also faced significant workforce issues related to managing procurement and inventory of critical medicines if the COVID-19 surge had materialised which contributes to advance ordering.
- As fewer orders were fully supplied, hospitals increased orders with a range of suppliers in order to mitigate the risk of undersupply should a surge materialise.

3. Demographics

From Friday 17 April to Friday 15 May 2020, SHPA's survey was completed confidentially by two hundred and seventy-two (272) respondents on behalf of hospitals. Many hospitals responded each week, while some responded less frequently. Participating hospitals were broadly representative with a majority from the public sector, while private hospitals accounted for fifteen per cent (15%) of

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respondents. Across the snapshot period, responses were spread across regional (37%), rural/remote (17%) and metropolitan (46%) areas.

4. Strategic medicine reserves

According to polls conducted by SHPA in mid-May, Directors of Pharmacy were aware that reserves of critical medicines were being established, but unaware of which medicines are in these reserves, how much is stored, or how they could be accessed in an emergency (see Table 1). This indicates that information from jurisdictional governments regarding medicine reserves has failed to support hospital confidence, if this was the intention.

- Sixty-seven per cent (67%) of Directors of Pharmacy reported they were independently determining appropriate stock holdings to support their hospital's COVID-19 management plan.
- Seventy per cent (70%) of Directors of Pharmacy reported their preparedness plans have been modified over the five weeks of the capacity snapshots to respond to the volume of COVID-19 admissions.

Question	Yes	No	N/A
Are you aware of a strategic medicines reserve you can draw on if your hospital is unable to supply adequate medicines to meet demand?	**78%**	22%	-
Are you aware of the extent of this reserve?	33%	**57%**	10%
Are you confident it will meet the demands in event of your planned for surge scenario?	10%	**75%**	15%

Table 1: Poll of Directors of Pharmacy week commencing Monday 18 May 2020

5. Hospital capacity

Hospitals participating in SHPA's capacity snapshots are playing an essential role in Australia's response to the COVID-19 pandemic. After initially aiming to boost ICU and HDU beds by up to two hundred and fifty per cent (250%), most hospitals have revised their original preparedness plans as the COVID-19 pandemic has evolved.

- Fifty-one per cent (51%) of hospitals who participated in capacity snapshot series have treated patients with a confirmed diagnosis of COVID-19 in either an HDU or ventilator-capable ICU bed.
- Fifty-seven percent (57%) of these hospitals were in metropolitan areas, thirty-seven per cent (37%) in regional areas and six per cent (6%) in rural/remote locations.
- Across the survey series, hospitals have consistently indicated they were planning for a maximum ventilator-capable ICU bed capacity of approximately two and a half times (~250%) their pre-COVID-19 capacity.

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- The responding hospitals planned to maintain an average of sixteen (16) ventilator-capable ICU beds over the next month. On average hospitals were intending to maintain an additional fifty-three per cent (53%) of ICU beds.
- Thirty-one per cent (31%) of hospitals reported they planned to maintain additional ventilator-capable ICU beds past the end of June 2020, and seventy-seven per cent (77%) planned to maintain increased inventory of critical medicines in the event of a surge.

6. Medicine treatment projections

To identify medicine shortages that could limit clinicians' capacity to treat critically ill COVID-19 patients, SHPA built projections of medicine requirements for additional ICU and HDU beds established by hospitals as part of their preparedness plan. Treatment for critically ill patients with COVID-19 typically involves intubation and ventilation, requiring the use of anaesthetic and neuromuscular blocker agents such as propofol and cisatracurium.

- During the snapshot period, hospitals had insufficient medicines to ensure all ventilator-capable beds could be utilised.
- The majority of participating hospitals reported insufficient stock of propofol and neuromuscular blockers to treat patients should all their beds be required for the typical ten-day length of stay/admission.
- A significant subset of these hospitals reported insufficient stock of propofol and neuromuscular blockers to treat patient numbers equivalent to their full ICU bed capacity for a single day.

7. Medicine shortages

Hospitals were directed by jurisdictional authorities to procure medicines to support an increased number of ventilator-capable beds as part of COVID-19 planning. In most cases they were unable to do this to an adequate level. In particular, they were unable to obtain sufficient neuromuscular blockers to support widespread intubation and ventilation, an essential treatment for critically ill COVID-19 patients.

Initial reports by hospitals indicated eighty percent (80%) of propofol orders were not supplied in full. Subsequent questions sought to establish the appropriateness of these orders; analysis of these results indicated propofol orders over the full study period were well short of meeting respondents' increased ICU bed capacity.

Across the snapshot period (17 April – 15 May) backorders of propofol and neuromuscular blockers (NMB) were steady, with backorders typically more common than supply. While propofol supply showed gradual improvement (see Graph 1), neuromuscular blockers did not (see Graph 2).

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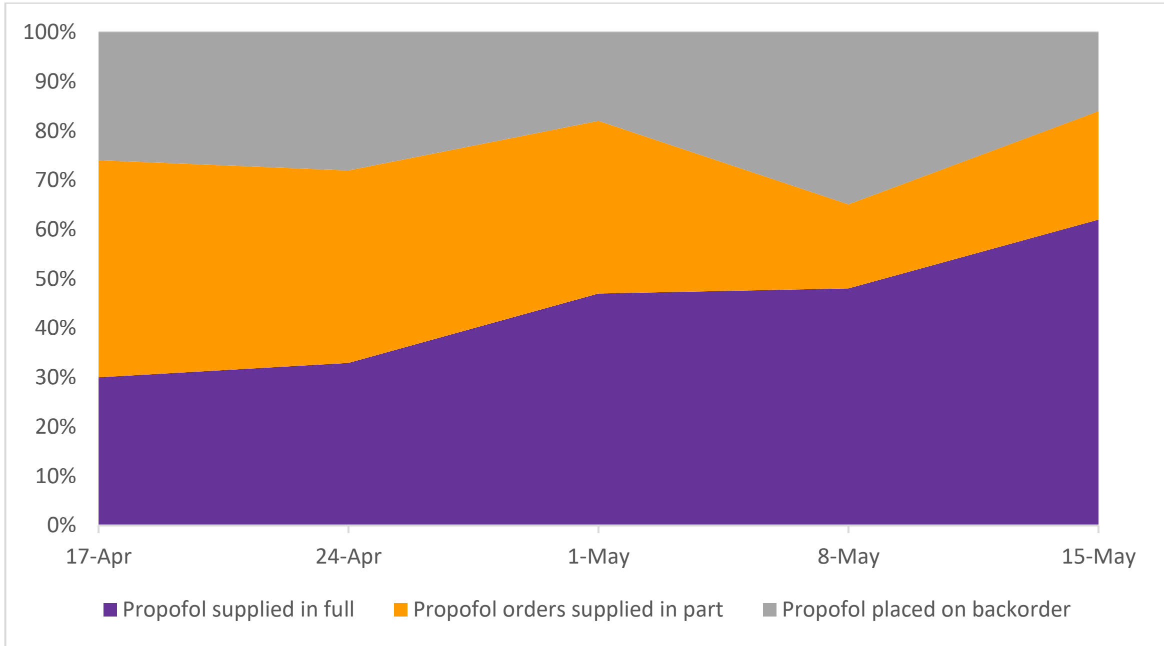
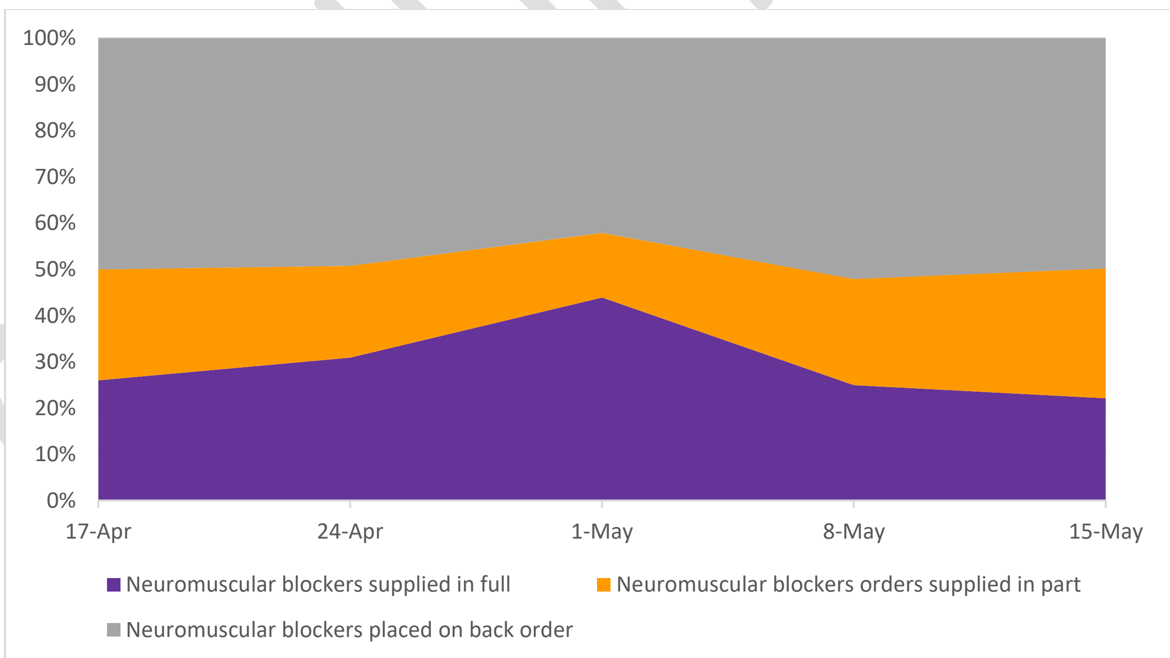


Graph 1. Propofol order by partial, full and backordered supply



Graph 2. NMB order by partial, full and backordered supply

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- Considering propofol dosing to maintain sedation for ventilated patients is a continuous infusion (not bolus injection), and assuming all orders were for the ICU (propofol is also used for anaesthesia), the quantity ordered between 11 April –11 May by all hospitals was only sufficient to supply the pre-COVID-19 ICU capacity. Propofol orders over the full study period were therefore well short of meeting expanded ICU bed capacity.
- Stocks of critical medicines including; cisatracurium, rocuronium, atracurium, vecuronium, pancuronium and propofol remain problematic even after the first threat of a surge has passed. Of these, vecuronium supply is the strongest at the time of the final report, with sixty-seven per cent (67%) of orders supplied in full.
- Stock levels of cisatracurium remain persistently low, with sixty-three per cent (63%) of requests across relevant products reported as either 'order unable to be placed' or 'backorder'.
- Regional, rural and remote hospitals have reported significantly higher experience of part-orders and orders placed on backorder over the snapshot period.
- Most often this is the result of a lower delivery of 'part-orders' which is often ten per cent points lower than the metropolitan rate.
- In one week (8 May report) it was reported that ninety per cent (90%) of rural/remote orders were placed on backorder, with only three per cent (3%) of orders received in full and seven per cent (7%) in part.

8. Resumption of elective surgery

SHPA is supportive of the need to resume elective surgery, recognising its important role in maintaining community health. Surgery largely utilises the same pool of medicines used to treat critically ill COVID-19 patients, meaning that use for one purpose reduces capacity for other use. Our members were concerned that the resumption of elective surgery could impact negatively on capacity for treatment of critically ill COVID-19 patients.

- In late April – early May more than eighty per cent (80%) of hospital respondents were less confident or unsure their propofol supply chains would sufficiently meet the demands of both COVID-19 planning and elective surgery.

9. Clinician confidence in medicine supply

Over the first four surveys, Directors of Pharmacy were surveyed regarding how confident they were on procuring the clinician-preferred medicines for treatment of critically ill COVID-19 patients at current capacities and planned capacities.

While confidence for treatment at current capacity improved steadily over the four weeks as Australia continued to flatten the curve, confidence for treatment at the maximum planned capacity remained persistently low. Half of respondents consistently said they had little or no confidence in managing the maximum planned capacity.

In response to current planned ventilator capacity over the next month only twelve and a half per cent (12.5%) of respondents expressed high levels of confidence in this regard (see Table 2).

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Not at all confident	Not so confident	Somewhat confident	Very confident	Extremely confident
8.5%	19.5%	58.5%	4%	8.5%

Table 2: Clinician confidence of stock supply for next four weeks as of Friday 15 May 2020

10. Key recommendations

1. Assess actual medicine use in Australian ventilated COVID-19 patients to provide greater clarity on future requirements (in the event of a resurgence of cases or another pandemic).
2. Undertake epidemiological modelling to assess the risk of a second wave of COVID-19 cases, incorporating an exponential growth phase, occurring across multiple sites, to assist in assessing the appropriateness of medicines supplies, as mitigating measures are rolled back.
3. Strengthen Australia's medicines supply system to reduce the chance that Australia is left at risk of undersupply of critical medicines during an international pandemic.
4. Encourage and foster collaboration between Australia's jurisdictions on access to medicines to aid emergency preparedness.
5. Increase transparency of medicine stocks held in hospitals to enable smoother coordination of efforts to move stock if required.
6. Provide additional support to regional, rural and remote hospitals, who face a greater challenge due to limitations on transport and travel, with resulting prolonged delays in the supply of medicines.

11. Conclusion

SHPA's five weekly surveys capture a high level of concern held by hospitals (272 responses) during preparation for the COVID-19 pandemic. Despite regular discussion at high levels of government, visibility of medicines supply for hospitals was problematic during this period. This lack of transparency regarding the accessibility of medicines in wholesaler facilities, and potentially in government reserves, impacted hospital confidence and resulted in significant inefficiency as resources were diverted from clinical care to procuring stock that did not eventuate.

The situation for regional, rural and remote hospitals treating COVID-19 patients (43% of all hospital respondents that treated COVID-19 patients) is especially concerning given thirty-eight per cent (38%) of regional orders were placed on backorder in the final survey week. These regional and rural hospitals are required to work blind, as they seek to procure medicines to treat patients.

Fortunately, it seems less likely that an Australian surge is imminent, however the mid to long-term impact of COVID-19 in 2020 remains uncertain. SHPA is unaware of updated modelling that can inform the future

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procurement of medicines for hospitals. We look forward to working with the government on policy and regulation which can improve this systemic issue to ensure Australian patients do not face the limitations on COVID-19 treatment that medicine shortages have imposed on patients in numerous other countries.

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