

LETTER TO THE EDITOR

Efficiency considerations for acute surgical units in rural and regional Australia

A chain is no stronger than its weakest link.

Thomas Reid, *Essays on the Intellectual Powers of Man*, 1786.¹

Implemented in Australia since 2005,² the acute surgical unit (ASU) model was developed in response to the changing landscape of general surgery which saw an increase in subspecialisation (e.g. bariatric, hepatobiliary and colorectal surgery) and a push to improve the quality of care for surgical emergencies, which were often delayed until after elective commitments, resulting in suboptimal care.³ ASUs are structured in various models worldwide, forming a spectrum. At one end, there is the combination of acute surgery, trauma and critical care⁴; in the middle, combined trauma and emergency surgery services with a separate critical care service⁵; and at the other end, all services are separate.³ In rural/regional areas where the trauma load is smaller or a trauma unit is absent, a multidisciplinary approach combining emergency surgery, trauma and critical care is often employed.³ However, not all rural/regional hospitals have a dedicated ASU, as this relies heavily on adequate patient volume and the hospital's size and capacity. Therefore, in hospitals, considerations must be made for staff capacity, unit's efficiency and patient flow, particularly regarding the transfer of patients from the ASU to other general surgery specialties.

Regarding efficiency for rural/regional ASUs, multiple considerations need to be addressed to ensure optimal patient care and timely discharge. It is important to look at the metrics and endpoints for an ASU. Typically, patients have an operation and are either discharged, reassigned to an inpatient bed card, or transferred out to a tertiary centre for more complex cases. Measures of efficiency typically include the length of hospital stay,⁶ time to surgical review, time to theatre and the number of surgeries performed outside of hours. The theme here includes 'Length' or 'Time', owing efficiency to be one of the most important metrics measured for an ASU. However, there are multiple factors that skew these metrics for rural centres, without a deeper understanding of these, there is a real risk of undervaluing rural ASUs.

Benefits of a dedicated ASU team have been widely documented^{2,6} such as reduced time to theatre, less

after-hours operations, lower complications and reduced length of stay. However, evidence is limited about the efficiency of ASU in regional Australia. One of the primary challenges is the geographical distance many patients must travel to access these units. Rural patients often come from long distances, and the ability to discharge them out may not solely depend on their current clinical status. In dealing with transfer referrals the longstanding rule of 'if a colleague asks for help, it should not be denied' is generally followed; however, this can still be an issue with clinicians required to call multiple centres for an accepting team; this can be further complicated by bed blockage once accepted. Often these patients are parked on the acute surgical unit for hours to days until their transfer. On discharge, ensuring patients have reliable transportation options is crucial, as delays are often seen when transportation is not readily available or affordable, a problem magnified in the rural setting.

Additionally, limited access to follow-up care remains a significant barrier. Rural areas often face shortages in primary care providers, specialists and rehabilitation services,⁷ which can delay discharge until appropriate follow-up care is arranged. This lack of services can be compounded by the limited availability of home health services and Hospital in the Home (HITH) programs, which are essential for patients who require ongoing medical attention post-discharge. Provision and implementation of home services, meal help, community rehabilitation and administration of complex medications remains a difficult challenge, and often leads to a readmission if overlooked.

Furthermore, it is important that surgical staff are well-trained for all different types of presentations due to the deployment of emergency surgery, trauma and critical care as a single ASU unit in rural/regional areas. In rural/regional areas, injuries related to farming and motor vehicle accidents (MVs) are common with high fatality rates per capita, with remote and very remote areas experiencing fatality rates 6 and 13 times higher than major cities, respectively.⁸ Rural areas account for 65% of fatal crashes occurring here,⁸ underscoring the critical need for effective trauma management and timely surgical interventions in rural ASUs.

In recent years, many hospitals have decided to digitalise health care to help streamline and improve efficiency,

reduce administrative burdens, and enhance the accuracy and accessibility of patient information.⁹ This has been aided through implementation of electronic medical records (EMR). In more recent times, trialling the application of novel technologies such as artificial intelligence (AI) to make this process even more streamlined. However, for a vast portion of rural and regional systems they are unable to implement this systemic shift, owing it to lack of funding and unstable network and infrastructure.¹⁰ ASUs have a high turnover of patients, from discharging home to interhospital transfers, this leads to a substantial amount of paperwork involved in patient care, hindering efficiency.

The current body of literature^{2,6} on ASUs largely neglects rural settings, focusing almost exclusively on metropolitan or inner regional centres. It is crucial that future studies provide actionable insights and recommendations to help rural ASUs overcome these barriers and improve health outcomes for their communities. A focus on rural ASU metrics would help determine performance, quality of care and areas for improvements.

Optimising efficiency requires a multifaceted approach. Addressing geographical challenges, ensuring access to transportation and follow-up care, and acknowledging the different common presentations compared with metropolitan areas and building the capacity of ASU staff are essential. Utilising and implementing novel technologies such as EMRs supported by AI can further enhance efficiency. Additionally, comprehensive discharge planning, strong interhospital relationships and efficient resource utilisation are crucial for improving patient outcomes and reducing discharge delays. By focusing on these areas, rural ASUs can significantly enhance the quality of care and ensure the timely, efficient management of surgical patients in rural Australia.

AUTHOR CONTRIBUTIONS

Gavin J. Carmichael: Conceptualization; investigation; writing – original draft; writing – review and editing. **Joshua G. Kovoov:** Conceptualization; investigation; writing – review and editing; writing – original draft. **Win Le Shwe Sin Ei:** Investigation; writing – review and editing. **Thiep Kuany:** Investigation; writing – review and editing; conceptualization. **James Stafford May:** Investigation; writing – review and editing. **Alexander Beath:** Investigation; writing – review and editing. **Yasser Arafat:** Investigation; writing – review and editing. **Mathew O. Jacob:** Conceptualization; investigation; writing – review and editing; supervision.

CONFLICT OF INTEREST STATEMENT


None declared.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

ETHICS STATEMENT

This perspective did not involve research on human or animal subjects, and thus institutional ethics approval was not required.

Gavin J. Carmichael BSc^{1,2,3} 
 Joshua G. Kovoov MS^{1,2,3,4} 
 Win Le Shwe Sin Ei MPH^{1,3}
 Thiep Kuany MD¹
 James Stafford May MD (Dist.)^{1,3} 
 Alexander Beath MD^{1,2,3}
 Yasser Arafat FRACS^{1,3}
 Mathew O. Jacob FRACS^{1,2,3,4}

¹Ballarat Base Hospital, Ballarat, Australia

²University of Melbourne, Ballarat, Australia

³Grampians Research Initiative, Ballarat, Australia

⁴Deakin University, Ballarat, Australia

Correspondence

Joshua G. Kovoov, Ballarat Base Hospital, 1 Drummond St N, Ballarat, Vic. 3350, Australia.
 Email: joshua.kovoov@gh.org.au

ORCID

Gavin J. Carmichael  <https://orcid.org/0009-0009-2143-3896>

Joshua G. Kovoov  <https://orcid.org/0009-0002-6814-4388>

James Stafford May  <https://orcid.org/0000-0003-1533-1155>

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