

# SHPA Standards of Practice for Critical Care Pharmacy Practice

## SHPA Committee of Specialty Practice in Critical Care

*These are standards of professional practice and not standards prepared or endorsed by Standards Australia. They are not legally binding.*

### INTRODUCTION

The discipline of critical care pharmacy practice has evolved over the past 25 years to the point where a critical care pharmacist is an integral member of the multidisciplinary team in the intensive care unit.<sup>1</sup> Pharmacists have demonstrated their contribution to reduction in morbidity and mortality, as well as in the management of drug costs.<sup>2-5</sup> These standards should be read in conjunction with the SHPA standards of practice for clinical pharmacy.<sup>6</sup> The standards of practice in emergency medicine may also be of use.<sup>7</sup>

### OBJECTIVE

These standards describe the scope of pharmacy services required by critical care patients, identify the scope of practice for the critical care pharmacist and recommend service and personnel requirements for the provision of optimal pharmaceutical care to critical care patients. A critical care pharmacy service should ensure:

- delivery of high-level clinical pharmacy services by suitably trained and qualified pharmacists with sound clinical knowledge. (These pharmacists should also be skilled in clinical education, research, and management);
- provision of medicines advice to health professionals and patients (carers) based on the best available published evidence;
- management of the individual patient with a view to reducing morbidity, mortality and length of stay; and
- prevention of adverse drug events and associated costs through optimisation of medication use and prevention, detection and correction of medication errors.

### DEFINITION

A critical care pharmacist is a practitioner who has an expert level of competency in critical care pharmacy practice. The critical care pharmacist contributes to patient-care activities in a consistent, efficient and effective manner that reflects the philosophy of pharmaceutical care. A critical care pharmacist has responsibility for delivering pharmacy services in critical care areas such as intensive care units and coronary care units, and is an integral member of the multidisciplinary team.

### EXTENT AND OPERATION

In an institution with a critical care unit, a suitably trained and qualified pharmacist is required to facilitate quality use of medicines with the aim of optimising patient care. The critical care pharmacist will actively participate in unit rounds and ward meetings, and in collaboration with other multidisciplinary team

members pursue optimal drug therapy for critical care patients. This requires pharmacists to collect and interpret pertinent clinical data, and assume professional responsibility for optimising drug therapy outcomes.

The review and reconciliation of medications should be performed as detailed in the standards of practice for clinical pharmacy and standards of practice for the provision of medication reconciliation.<sup>6,8</sup> Medication safety is paramount with attention paid to drug infusion orders, infusion rates, fluid status, intravenous line compatibilities and parenteral nutrition.

Critical care pharmacists should contribute to the development, implementation and review of relevant drug policies and guidelines, and to research into the quality use of medicines and the practice of clinical pharmacy in this setting.

Critical care pharmacists should be involved in the education of other health professionals in the quality use of medicines, as well as pre-registrants and colleagues practising in their own and other institutions.

There should be sufficient staff with current competency so that adequate support is consistently provided in times of staff shortage or increased demand for services.

### POLICIES AND PROCEDURES

Documentation of standards of practice, standard operating procedures, range and extent of pharmacy services provided, availability of service, current job descriptions, local practices including site-specific regulations or procedures must be maintained. They should be reviewed annually and maintained centrally in a procedure manual.

Routine review of critical care patients should involve developing a Medication Action Plan for each patient as detailed in the standards of practice for clinical pharmacy.<sup>6</sup> It may be necessary to review critical care patients more than once a day as their condition can change rapidly. Although not an exhaustive list, the following critical care aspects need to be addressed:

- drug infusion orders (e.g. concentration, infusion fluid, compatibility, rate, patient fluid status);
- other drug orders (particularly with respect to dosing and administration regimens);
- haemodynamics management;
- sedation and analgesia;
- stress-ulcer prophylaxis;
- venous thromboembolism prophylaxis;
- renal replacement therapies and the effect on, for example drug clearance, anticoagulation;
- infection and antimicrobial therapy;
- nutritional support formulations and electrolyte management (e.g. TPN, K<sup>+</sup>, Mg<sup>2+</sup>, PO<sub>4</sub><sup>3-</sup>);
- gastrointestinal management (e.g. prokinetics, laxatives);
- respiratory ventilation devices and other mechanical support (e.g. plasmapheresis);
- potential for drug-drug interactions, drug-disease interactions, adverse drug events;
- drug and poison information; and

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- advice about the ongoing management of patients' regular medications.

Critical care pharmacists should ensure that the following systems are in place:

- implementation of a Medication Action Plan for each patient, that identifies therapeutic goals and provides relevant information for optimal medicines management, including an accurate medication history, interfaces with patient laboratory data, drug allergy alerts, maximum dose limits, and drug-drug and drug-food/nutrient interactions and other tools for medicines management;
- communication between critical care pharmacists and other ward pharmacists so that timely and succinct handover is ensured as patients are transferred from critical care areas to other wards and vice versa;
- policies and procedures related to safe and effective use of medications in the critical care setting;
- quality improvement with regular audits of drug protocols, drug use evaluation and other medicines related unit policies; and
- timely, safe and efficient drug distribution and storage.

Critical care pharmacists should also be involved in activities such as critical care therapeutics, nutritional support formulations, cardiorespiratory resuscitation therapeutics, and in clinical research projects. Critical care pharmacists should provide this service on a daily basis by participating regularly on rounds with the intensivist and the critical care team, providing drug therapy-related education to critical care team members, and taking part in multidisciplinary quality activities.

## RESOURCES

The critical care pharmacy service should be adequately resourced to ensure appropriate and consistent service delivery. This includes availability of support staff to minimise non-clinical activities being undertaken by clinical pharmacists. Adequate office and storage space should also be made available for protocol books and other references including educational material should be collated and maintained. This should include the references listed in the Appendix. Critical care pharmacists should also have access to pertinent critical care journals and journals which contain articles and drug therapy suitable for critical care patients (Appendix). There should be direct access to enable rapid literature review and access to expert advisory services (Appendix). The critical care pharmacist should be provided with sufficient resources to obtain formalised accreditation and/or training.

## STAFFING STRUCTURE AND LEVELS

To allow critical care pharmacists sufficient time to perform their essential clinical duties, the Allied Health Professionals and the Healthcare Scientists Advisory Group in the UK recommend 0.05 to 0.1 full-time equivalent Grade D pharmacist for every level 3 bed and every level 2 critical care bed.<sup>9</sup> The UK Intensive Care Society state that the intensive care unit should have dedicated clinical pharmacist input (Tables 1, 2). The standards of practice for clinical pharmacy also make recommendations for bed type to pharmacist ratios (Table 3).<sup>6</sup>

## TRAINING AND EDUCATION

The SHPA Committee of Specialty Practice in Critical Care recommends that critical care pharmacists should have postgraduate qualifications in clinical pharmacy. Critical care pharmacists should also maintain 30 hours of continuing professional development per year as defined by SHPA, with a minimum of 20 hours within the field of critical care.

**Table 1. Classification of critical care patients<sup>9</sup>**

Level	Description
Level 0	Patients whose needs can be met through a normal ward.
Level 1	Patients at risk of their condition deteriorating, or those recently relocated from higher levels of care, whose needs can be met on an acute ward with additional advice and support from the critical care team.
Level 2	Patients requiring more detailed observations or interventions including support for a single failing organ system or post-operative care and those 'stepping down' from higher levels of care.
Level 3	Patients requiring advanced respiratory support alone or basic respiratory support together with the support of two organ systems. This level includes all complex patients requiring support for multi-organ failure.

**Table 2. Recommendations for pharmacist staffing in critical care<sup>9</sup>**

Level	Recommendation
Level 2	The pharmaceutical care for the critical care patient should be provided by either a critical care pharmacist or an experienced pharmacist working in close collaboration. The level 2 pharmacist will have a close working relationship with the outreach team (known as the Medical Emergency Team in Australia).
Level 3	A critical care pharmacist should be an integral part of the critical care team. This person should also provide advice, support and education to pharmacy and clinical colleagues working at all levels of critical illness, and be the key pharmacist liaising with the outreach team.

**Table 3. Recommendation for critical care bed:pharmacist ratio<sup>6</sup>**

Ratio of beds per 1 EFT pharmacist	Type of bed
20	Coronary care
20	Transplantation
15	Emergency medicine
12	Intensive care unit

EFT = equivalent full time

Maintaining qualifications and competence is necessary to provide pharmaceutical care in the critical care units. This may be achieved by a variety of means including postgraduate degrees, other specialised practice experience, attendance at seminars and further research.

Regular attendance and participation at specialised seminars is encouraged to update and maintain specialist skills.

Critical care pharmacists should also be actively involved with the education from the critical area as detailed in the standards of practice for clinical pharmacy.<sup>6</sup>

## QUALITY ASSURANCE

A quality assurance program for the provision of clinical services to critical care patients must be developed and maintained. Key components of such a program include:

- establishing a quality program;
  - developing and publishing clear objectives;
  - developing clear and effective strategies and supporting plans; and
  - encouraging effective participation by appropriate staff.<sup>10</sup>
- Some quality activities that critical care pharmacists can have invaluable input into include:
- involvement in the development of drug policies, protocols, and prescribing guidelines;

- conducting pertinent research or being involved in clinical trials;
- conducting regular audits with the aim of improving patient safety, quality of care, and cost optimisation; and
- conducting critical reviews of pharmacist interventions with consultants.

### Key Performance Indicators

To measure outcomes and processes, the program should have a number of quality indicators. Quality indicators for provision of clinical pharmacy services to critical care patients could include the:

- percentage of patients with a toxic or subtherapeutic aminoglycoside concentration whose dosage has been adjusted or reviewed prior to the next dose;<sup>11</sup>
- percentage of patients at high risk of venous thromboembolism that receive appropriate prophylaxis;<sup>11</sup>
- percentage of prescriptions for restricted antibiotics that are concordant with drug and therapeutics committee approved criteria;<sup>11</sup>
- number of medication reviews by a pharmacist per number of total patient bed days in the intensive care unit;
- number of pharmacist interventions per number of total patient bed days in the intensive care unit; and
- number of drug information inquiries per number of total patient bed days in the intensive care unit.

### DOCUMENTATION

Critical care pharmacists should document clinical activities in the patient medical record and/or pharmacy information system which are linked to the dispensing system, or other information systems such as personal digital assistants. Information that needs to be documented include:

- patient-specific clinical pharmacist activities such as interventions, individualised medication action plan or any contribution and recommendations. (This should be accessible to all staff involved in the care of the patient); and
- non-individual patient directed services such as policies and procedures, workload, education provided and research.

Further guidance on documentation of patient profiles in the medical record, and of workload is provided in the standards of practice for clinical pharmacy.<sup>6</sup>

### References

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2. Timmons A. The contribution of the intensive care pharmacist in the United Kingdom. *Pharm J*; 265: 341-44.
3. Dasta JF, et al. The critical care pharmacist: what you get is more than what you see. *Crit Care Med* 1994; 22: 906-9.
4. Leape L, Cullen D, Clapp M, et al. Pharmacist participation on physician rounds and adverse drug events in the intensive care unit. *JAMA* 1999; 282: 267-70.
5. Chi J. Boston Pharm.D. blazes trail for other R.Ph.s to go on rounds. *Lancet* 2000; 144: 50-52.
6. SHPA Committee of Specialty Practice in Clinical Pharmacy. SHPA standards of practice for clinical pharmacy. *J Pharm Pract Res* 2005; 35: 122-46.
7. SHPA Committee of Specialty Practice in Emergency Medicine. SHPA standards of practice in emergency medicine pharmacy practice. *J Pharm Pract Res* 2006; 36: 139-42.
8. Burridge N. SHPA standards of practice for the provision of medication reconciliation. *J Pharm Pract Res* 2007; 37: 231-3.
9. National AHP and HCS Critical Care Advisory Group. Allied health professionals and healthcare scientists critical care staffing guidance. National AHP and HCS Critical Care Advisory Group. Critical care programme. Modernisation Agency. July 2003.
10. Elliott R, ed. Critical care therapeutics. The role of the pharmacist in intensive care: ICU pharmaceutical care checklist. London: Pharmaceutical Press; 1999.
11. NSW Therapeutic Advisory Group. Indicators for quality use of medicines in Australian Hospitals. Sydney: NSW TAG; 2007

### Appendix. Recommended references for a critical care pharmacy service

#### Text books

Oh TE, editor. Intensive care manual. 5th ed. Oxford: Butterworth-Heinemann; 2003.

Ashley C, Currie A. The renal drug handbook. 2nd ed. Abingdon: Radcliffe Medical Press; 2004.

#### Journals

New England Journal of Medicine (Massachusetts Medical Society)

Critical Care Medicine (Lippincott Williams & Wilkins)

Journal of Intensive Care Medicine (Sage Publications)

Annals of Pharmacotherapy (Harvey Whitney Books Company)

Emergency Medicine Journal (BMJ Publishing Group Ltd)

Chest - The Cardiopulmonary and Critical Care Journal (American College of Chest Physicians)

Transplantation Proceedings (Elsevier Science)

#### Web sites

Medscape Medicines information <[www.medscape.com](http://www.medscape.com)>

E-mail discussion group for critical care pharmacists <[AustNZcritcarepharmacist@yahoo.com.au](mailto:AustNZcritcarepharmacist@yahoo.com.au)>

Australian and New Zealand Intensive Care Society <[www.anzics.com.au/](http://www.anzics.com.au/)>

International Society of Heart/Lung Transplantation <[www.isHLT.org/](http://www.isHLT.org/)>

Australian College for Emergency Medicine <[www.acem.org.au/](http://www.acem.org.au/)>

Australian Resuscitation Council <[www.resus.org.au](http://www.resus.org.au)>

Arnoff G, et al. Drug prescribing in renal failure. 4th edition. <[www.kdp-baptist.louisville.edu/renalbook/](http://www.kdp-baptist.louisville.edu/renalbook/)>

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