

Sepsis Clinical Care Standard

Antimicrobial guidance for sepsis

The *Sepsis Clinical Care Standard* states that when signs of infection-related organ dysfunction are present, appropriate antimicrobials should be commenced within 60 minutes (Quality statement 3 – Management of antimicrobial therapy).

Any healthcare service likely to manage acute presentations of sepsis should have appropriate antimicrobials on hand to provide urgent, lifesaving treatment. These antimicrobials should be determined as part of an antimicrobial formulary and accompanied by guidance and policies to support rapid access 24 hours per day.

Who this resource is for

This resource provides guidance for healthcare services in relation to antimicrobial preparedness for treating sepsis.

The purpose of this resource is to assist hospitals and acute facilities in considering their systems to ensure rapid access to appropriate antimicrobials for patients with sepsis. It should be considered in conjunction with the *Sepsis Clinical Care Standard*, and antimicrobial stewardship (AMS) policies and procedures, including the *Antimicrobial Stewardship Clinical Care Standard*.

Antimicrobials

Access to appropriate empiric antimicrobials within 60 minutes of infection-related organ dysfunction is a key component of the *Sepsis Clinical Care Standard*. The appropriate empiric antimicrobial for an individual patient will depend on the source of infection, patient factors, local microbiology and the service's antimicrobial formulary (see below). The choice of antimicrobial should be reviewed as information from investigations becomes available, in line with the *Antimicrobial Stewardship Clinical Care Standard*.

Antimicrobial formularies

An antimicrobial formulary is a list of antimicrobials that has been approved for use within a healthcare service or network. A formulary is an essential recommendation of an AMS program. Formulary systems establish rules governing medicines use. The antimicrobial formulary should be appropriate to the needs of the healthcare service, and consider the population health needs of the catchment for the service, the range and complexity of clinical services provided, local antimicrobial resistance patterns, the range of antimicrobials required, and the service's access to supply of antimicrobials. Each of these factors will inform the appropriate agents to be held for acute management of sepsis.

Approval systems for restricted antimicrobials

Implementing formulary restriction and approval systems that include restricting broad-spectrum antimicrobials to patients in whom their use is clinically justified is an essential component of AMS programs.¹ Often, approval is required for highly restricted antimicrobials before use or within 24 hours of initiation. Highly restricted antimicrobials might be excluded from the ward imprest to ensure that pharmacists are involved in their dispensing, improve oversight, and that antimicrobial use meets formulary conditions.¹

After hours, approval for individual patient use may occur through an infectious diseases consult or after-hours call, or through a computer-generated approval system.

Approval systems must include registration of the appropriate indication for use of all restricted antimicrobials.¹ **These systems should ensure that a patient with sepsis receives immediate access to appropriate antimicrobials and should not delay treatment.**

Systems to ensure access to appropriate antimicrobials for sepsis patients

Healthcare services may use different systems to ensure rapid and appropriate access to empiric antimicrobials for sepsis, which may be restricted broad-spectrum agents. Examples are online medicine formularies, after-hours drug cupboards and sepsis boxes.

A limited number of antimicrobials need to be accessible 24 hours a day, seven days a week for emergent treatment of adult or paediatric sepsis. Consider clinical need and evidence-based guidelines to improve access and support appropriate antimicrobial prescribing and use.

Accessible list of medicines on ward imprest

An online medicines formulary provides a list of medicines on imprest in each ward (listed according to generic or active ingredient name). This enables staff to easily search for and locate particular antimicrobials and facilitates access after hours.

Note that if the intensive care unit or emergency department is routinely being approached by other wards to supply antimicrobials, this should be reviewed, and other solutions considered – such as an after-hours supply (in a drug room or cupboard) or sepsis boxes. This will assist with obtaining accurate antimicrobial surveillance data for each ward/unit.

After-hours drug rooms or cupboards

An after-hours drug room or cupboard is another option for providing access to restricted antimicrobials when the pharmacy department is closed.

In some systems, nursing staff request a medicine from the after-hours room or cupboard, which is only accessible by an after-hours senior nurse manager or on-call pharmacist.

Alternatively, after-hours drug cupboards may be in a central area where clinicians can access one or two doses of restricted antimicrobials and record use for review within business hours by the AMS team or pharmacy department.

Guidance on administration of antimicrobials

Uncertainty about appropriate dosing, choice and administration procedures can contribute to delays in therapy. Provide ready access to guidance for administration of antimicrobials in sepsis, including:

- Guidance on co-administration of intravenous fluids and antimicrobials
- Guidance on drawing up and administration of antimicrobials to children
- Minimum appropriate administration duration for each antimicrobial formulation
- Instructions for ordering multiple antimicrobials so that the sequence of administering each antimicrobial ensures the shortest possible administration time to the highest number of antimicrobials (such as administering medicines with shorter administration times before those with long administration or infusion times).

This guidance can be printed out and included in sepsis boxes, incorporated into sepsis pathway materials or used as wall charts, and should be supported by education for nursing staff.

Sepsis boxes

A sepsis box is a single-use container that contains all the necessary equipment and medicines to enable clinicians to implement sepsis care rapidly when sepsis is identified. These boxes can be located within an after-hours drug room or cupboard, or in a healthcare service or unit that does not routinely stock broad-spectrum antimicrobials.

The box has a sealed compartment for treatment of a single patient and could include:

- Blood culture sets (two for adults, one for children)
- Blood gas collection sets
- Antimicrobials (one or two doses of selected medicines)
- Intravenous fluid for bolus administration
- Cannulation equipment and giving sets (consider different requirements for paediatrics)
- A copy of the local sepsis pathway or guideline, and guidance on how to reconstitute and administer the antimicrobials.

When used appropriately as part of a sepsis program, sepsis boxes can improve access to antibiotic administration within an hour, blood lactate measurement, and administration of intravenous fluids.²

A sepsis box should be developed with consideration of the organisation's antimicrobial formulary and with advice from experts in infectious diseases and AMS. The contents chosen should be stable in the clinical environment – for example, in hot, remote climates, avoid items that require refrigeration.

Consideration should be given to the optimal location of the sepsis box, including clinical areas where sepsis may be more likely to arise (such as haematology or oncology units) but where restricted antimicrobials will not be available on imprest. Locating a sepsis box on or with the resuscitation trolley can ensure that all components for urgent care are co-located.

Determining appropriate antimicrobials for sepsis boxes

Appropriate antimicrobials should be identified for inclusion in a sepsis box. They should include first-line empiric antimicrobials from *Therapeutic Guidelines*, the *Australian Injectable Drugs Handbook* and, where relevant, the CARPA manual³⁻⁵, and determined with reference to local infectious diseases guidelines, the antimicrobial formulary, and state or territory sepsis pathway recommendations.

A sepsis box will contain a limited number of doses of maximum child or adult doses of each agent selected. Decisions about the number of doses to include will depend on the site's ability to access further doses in a suitable time frame.

Governance and procedures for sepsis boxes

Healthcare services should conduct a risk assessment of the need for sepsis boxes, and the conditions required for their safe storage and use, before implementation. If a sepsis box is to be used, services should:

- Develop a specific policy or protocol suitable for the healthcare service's location and access to pharmacy services
- Define who has oversight for maintaining expiry dates and auditing use of sepsis boxes; this may be a registered nurse, pharmacist or sepsis coordinator
- Provide guidance on how to restock and replace sepsis boxes
- Provide guidance on how to obtain ongoing supply of antimicrobials, after the initial dose(s)
- Ensure regular training and education for relevant clinical staff on how to access and use sepsis boxes
- Determine appropriate placement of sepsis boxes and communicate their location – such as by using posters
- Monitor the number and locations of sepsis boxes
- Monitor compliance with the policy.

Sepsis boxes should be:

- Guided by a specific policy or protocol
- Prepared in conjunction with the local or networked pharmacy and sealed, ideally for one-time use
- Replaced or restocked after use
- Kept in a locked clinical room with other medicines that is not accessible to the public
- Limited to a small number of doses of restricted antimicrobials as determined by the local policy; ongoing use should follow the usual AMS formulary approval process
- Clearly labelled with the expiry date of the earliest expiring medicine
- Have a documented periodical review of the expiry date.

More information

Requirements and benefits of formularies

- The [National Safety and Quality Health Service \(NSQHS\) Preventing and Controlling Infections Standard](#) requires health service organisations to have an AMS program that includes an AMS policy and an antimicrobial formulary that has restriction rules and approval processes
- The [Antimicrobial Stewardship in Australian Health Care](#) outlines key strategies for an effective AMS governance structure, including implementing formulary restriction and approval systems¹
- The [Priority Antibacterial List for Antimicrobial Resistance Containment](#) is a tool to support AMS. The list stratifies systemic antimicrobials according to preferred use categories for containment of antimicrobial resistance using the Access, Review, Curb and Contain (ARCC) classification system. It can be used to analyse antimicrobial use in terms of preferred or optimal prescribing choices, and may also be used to inform formulary restrictions.

State and territory roles and resources

State and territory governments are responsible for planning and implementing AMS and sepsis programs in public health service organisations. Most states and territories have expert AMS advisory processes to provide technical and strategic advice, jurisdictional antimicrobial formularies, and a range of resources to support AMS practice. Refer to your [local state or territory AMS formulary guidance](#).⁶

Sepsis resources include:

- NSW: [SEPSIS KILLS program](#), including pathways and educational resources
- Victoria: [Sepsis \(whole of hospital\) implementation toolkit](#) and [Sepsis clinical pathways](#)
- Queensland: [Sepsis pathways and resources](#)
- SA: [Sepsis information for health professionals](#)
- WA: [Sepsis recognition and management \(Perth Children's hospital\)](#)
- Tasmania: [Guide to sepsis](#)
- NT: [Sepsis Management Plan](#)
- ACT: [Emergency Department Adult Sepsis Clinical Pathway](#).

Questions?



Find out more about the *Sepsis Clinical Care Standard* and other resources. Scan the QR code or use the link [safetyandquality.gov.au/sepsis-ccs](https://www.safetyandquality.gov.au/sepsis-ccs).

References

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2. Kafle S, Nath N. Improving management of severe sepsis and uptake of sepsis resuscitation bundle in an acute setting. *BMJ Qual Improv Rep* 2014;3(1):u204152.w201807.
3. Antibiotic Expert Advisory Group. Therapeutic guidelines: antibiotic. Melbourne: Antibiotic Expert Advisory Group; 2019.
4. Symons KEJ. Australian injectable drug handbook (eighth edition). Collingwood: Society of Hospital Pharmacists of Australia; 2020.
5. Remote Primary Health Care Manuals. CARPA standard treatment manual (seventh edition). Alice Springs: Centre for Remote Health; 2017.
6. Australian Commission on Safety and Quality in Health Care. AMS Model Formulary [Internet]. Sydney: ACSQHC; 2022 [cited 2022 Mar 30]. Available from: www.safetyandquality.gov.au/our-work/antimicrobial-stewardship/ams-model-formulary