

# Adult Sepsis Antibiotic Administration Table

Adapted with permission from the Australian Injectable Drugs Handbook, 8<sup>th</sup> Edition

## General information

- Appropriate recognition and timely management of patients with severe infection and sepsis is a significant problem in NSW hospitals. Delayed treatment is associated with high mortality rates, significant morbidity and high costs to the health care system.
- From a microbiological perspective and to ensure compliance with the *Medication Handling in NSW Public Health Facilities* policy directive, injectable medication **must be prepared for only one patient at a time, immediately prior to their intended use**. Aseptic technique must be maintained during preparation.
- Displacement volume is the volume that the powder component of a drug takes up upon reconstitution. It needs to be added to the diluent volume to ensure accuracy in calculating doses that are less than a full vial. Thus, the diluent volume recommended in the Product Information (PI) may sometimes differ from the volume recommended in this guideline. If part doses are required, refer to the Australian Injectable Drugs Handbook.

**Volume of diluent to reconstitute a vial + displacement volume of drug powder = Final volume of vial**

- Where possible use separate dedicated lines for resuscitation fluid and for medications. When injecting antibiotics directly into an IV injection port which has resuscitation fluid running:
  - clamp the infusion fluid line and flush with 20 mL sterile sodium chloride 0.9% solution
  - administer antibiotic over the required time
  - flush the line with 20 mL sterile sodium chloride 0.9% solution and recommence resuscitation fluid.

Medication	Presentation	Reconstitution fluid/volume	Administration	Notes
<b>amikacin</b>	Vial: 500 mg/2 mL	Reconstitution not required	<b>IV Injection:</b> For doses less than 500 mg inject over 3 to 5 minutes  <b>Intermittent IV Infusion:</b> Dilute dose in a suitable volume of sodium chloride 0.9% and infuse over 15 to 30 minutes	<ul style="list-style-type: none"> <li>• Dose obese patients (BMI &gt;30) using <u>ADJUSTED BODYWEIGHT</u></li> <li>• Gentamicin is inactivated by penicillin and cephalosporin antibiotics. Do not mix in the same injection or infusion solution. Administer at separate sites if possible.</li> <li>• Therapeutic drug monitoring may be required for use beyond 48 hours</li> <li>• Potential for ototoxicity and nephrotoxicity, adjustment required in renal impairment</li> </ul>
<b>amoxicillin</b>	Vial: 1 g	Add 20 mL water for injection	<b>IV Injection:</b> Inject slowly over at least 3 to 4 minutes (preferably over 10 to 15 minutes)  <b>Intermittent IV Infusion:</b> Dilute the dose in 50–100 mL sodium chloride 0.9% and infuse over 30 to 60 minutes	<ul style="list-style-type: none"> <li>• Contraindicated in patients with immediate hypersensitivity to penicillins, carbapenems and cephalosporin antibiotics</li> <li>• Rapid IV administration may cause seizures</li> </ul>
<b>amoxicillin + clavulanic acid</b>	Vial: 600 mg 1.2 g 2.2 g	600 mg vial: Add 10 mL water for injection  1.2 g, 2.2 g vial: Add 20 mL water for injection	<b>IV Injection:</b> Inject over 3 to 4 minutes  <b>Intermittent IV Infusion:</b> Dilute 600 mg dose in 50 mL or larger doses in 100 mL of sodium chloride 0.9% and infuse over 30 to 40 minutes	<ul style="list-style-type: none"> <li>• Contraindicated in patients with immediate hypersensitivity to penicillins, carbapenems and cephalosporin antibiotics</li> <li>• Rapid IV administration may cause seizures</li> </ul>
<b>ampicillin</b>	Vial: 500 mg 1 g	Add 10 - 20 mL water for injection	<b>IV Injection:</b> Doses < 1 g inject over 3 to 5 minutes Doses of 1 – 2 g inject over 10 to 15 minutes	<ul style="list-style-type: none"> <li>• Contraindicated in patients with immediate hypersensitivity to penicillins, carbapenems and cephalosporin antibiotics</li> <li>• Rapid IV administration may cause seizures</li> </ul>

Medication	Presentation	Reconstitution fluid/volume	Administration	Notes
<b>azithromycin</b>	Vial: 500 mg	Add 4.8 mL water for injection	<b>Intermittent IV Infusion:</b> Dilute the dose in 250 mL sodium chloride 0.9% and infuse over 60 minutes	<ul style="list-style-type: none"> <li>• IV injection <u>not recommended</u></li> <li>• Local infusion-site reactions may occur</li> <li>• Severe allergic reactions may occur</li> </ul>
<b>benzylpenicillin</b>	Vial: 600 mg 1.2 g	600 mg vial: Add 10 mL water for injection  1.2 g vial: Add 20 mL water for injection	<p><b>IV Injection (doses ≤ 1.2 g):</b> Inject slowly over 5 to 10 minutes.</p> <p><b>Intermittent IV Infusion (doses &gt; 1.2 g):</b> Dilute the dose in 100 mL of sodium chloride 0.9 % and infuse over 30 to 60 minutes</p>	<ul style="list-style-type: none"> <li>• Contraindicated in patients with immediate hypersensitivity to penicillins, carbapenems and cephalosporin antibiotics</li> <li>• Rapid IV administration may cause seizures</li> </ul>
<b>cefepime</b>	Vial: 1 g 2 g	Add 10-20 mL sodium chloride 0.9%	<p><b>IV Injection:</b> Inject slowly over 3 to 5 minutes</p> <p><b>Intermittent IV Infusion:</b> Dilute the dose in 50–100 mL of sodium chloride 0.9% and infuse over 30 minutes</p>	<ul style="list-style-type: none"> <li>• Contraindicated in patients with immediate hypersensitivity to penicillins, carbapenems and cephalosporin antibiotics</li> </ul>
<b>ceftazidime</b>	Vial: 1 g 2 g	Add 10-20 mL water for injection	<p><b>IV Injection:</b> Inject slowly over 3 to 5 minutes to avoid vein irritation</p> <p><b>Intermittent IV Infusion:</b> Dilute the dose to a suitable volume with sodium chloride 0.9% and infuse over 15 to 30 minutes. Maximum concentration is 40 mg/mL</p>	<ul style="list-style-type: none"> <li>• Contraindicated in patients with immediate hypersensitivity to penicillins, carbapenems and cephalosporin antibiotics</li> <li>• Shake vial after reconstitution to dissolve. Solution will fizz and become clear in 1 to 2 minutes</li> </ul>

Medication	Presentation	Reconstitution fluid/volume	Administration	Notes
<b>ceftriaxone</b>	Vial: 500 mg 1 g 2 g	500 mg vial: Add 5 mL of water for injection  1 g vial: Add 10 mL of water for injection  2 g vial: Add 40 mL of sodium chloride 0.9%	<b>IV Injection (for doses up to 1 g):</b> Inject over 2 to 4 minutes  <b>Intermittent IV Infusion (2 g doses):</b> Dilute dose with 40 mL of sodium chloride 0.9% and infuse reconstituted solution over at least 30 minutes	<ul style="list-style-type: none"> <li>Contraindicated in patients with immediate hypersensitivity to penicillins, carbapenems and cephalosporin antibiotics</li> <li>Ceftriaxone must not be administered at the same time as IV calcium-containing products due to risk of precipitation. Sequential administration should occur after thorough flushing of the infusion line with a compatible fluid.</li> </ul>
<b>cefazolin</b>	Vial: 500 mg 1 g 2 g	Add 10 mL of water for injection	<b>IV Injection:</b> Inject slowly over 3 to 5 minutes. Dose of 2 g can be given over at least 5 minutes  <b>Intermittent IV Infusion:</b> Dilute the dose in 50–100 mL of sodium chloride 0.9% and infuse over 10 to 60 minutes	<ul style="list-style-type: none"> <li>Contraindicated in patients with immediate hypersensitivity to penicillins, carbapenems and cephalosporin antibiotics</li> </ul>
<b>ciprofloxacin</b>	Vial or infusion bag: 100 mg/50 mL 200 mg/100 mL 400 mg/200 mL	Reconstitution not required	<b>Intermittent IV Infusion:</b> Infuse into a large vein over at least 60 minutes	<ul style="list-style-type: none"> <li>Contraindicated in patients with known hypersensitivity reactions to ciprofloxacin and other quinolones</li> </ul>

Medication	Presentation	Reconstitution fluid/volume	Administration	Notes
<b>clindamycin</b>	Ampoule: 300 mg/2 mL 600 mg/4 mL	Reconstitution not required	<b>Intermittent IV Infusion:</b> Dilute doses up to 600 mg in 50 mL sodium chloride 0.9% and infuse over at least 20 minutes.  Dilute doses up to 1200 mg in 100 mL sodium chloride 0.9% and infuse over at least 30 to 40 minutes.  Maximum rate is 30 mg/minute.	<ul style="list-style-type: none"> <li>• <i>Dalacin-C</i> ampoules must be kept in the refrigerator (between 2-8°C) prior to administration whilst the Mylan brand can be kept at ambient temperature (&lt; 25°C).</li> <li>• Do not give by IV injection, rapid IV administration may cause hypotension and cardiac arrest</li> </ul>
<b>dexamethasone</b>	Ampoule or vial: 4 mg/1 mL 8 mg/2 mL	Reconstitution not required	<b>IV Injection:</b> Inject slowly over 3 to 5 minutes (may be diluted with 10 mL of sodium chloride 0.9 % to facilitate slow injection)  <b>Intermittent IV Infusion:</b> Dilute the dose in 50-100 mL of sodium chloride 0.9 % and infuse over 15 minutes	
<b>flucloxacillin</b>	Vial: 500 mg 1 g 2 g	500 mg vial: Add 10 mL water for injection  1 g vial: Add 15-20 mL water for injection  2 g vial: Add 40 mL of water for injection	<b>IV Injection:</b> Inject slowly over 3 to 4 minutes. A dose of 2 g can be injected over 6 to 8 minutes however infusion preferred  <b>Intermittent IV Infusion (preferred for 2 g doses):</b> Dilute the dose in a suitable volume of sodium chloride 0.9% and infuse over 20 to 30 minutes	<ul style="list-style-type: none"> <li>• Contraindicated in patients with immediate hypersensitivity to penicillins, carbapenems and cephalosporin antibiotics</li> <li>• Pain and phlebitis are common and can be severe – central venous access may be required for prolonged therapy</li> </ul>

Medication	Presentation	Reconstitution fluid/volume	Administration	Notes
<b>gentamicin</b>	Ampoule: 10 mg/1 mL 80 mg/2 mL	Reconstitution not required	<b>IV Injection:</b> Inject undiluted over 3 to 5 minutes (may be diluted to 20 mL with sodium chloride 0.9 % to aid slow injection)  <b>Intermittent IV Infusion:</b> Dilute the dose in 50-100 mL of sodium chloride 0.9% and infuse over 30 minutes	<ul style="list-style-type: none"> <li>• Dose obese patients (BMI &gt; 30) using <u>ADJUSTED BODYWEIGHT</u></li> <li>• Gentamicin is inactivated by penicillin and cephalosporin antibiotics. Do not mix in the same injection or infusion solution. Administer at separate sites if possible.</li> <li>• Therapeutic drug monitoring may be required for use beyond 48 hours</li> <li>• Potential for ototoxicity and nephrotoxicity, adjustment required in renal impairment</li> </ul>
<b>meropenem</b>	Vial: 500 mg 1 g	500 mg vial: Add 10 mL water for injection  1 g vial: Add 20 mL water for injection	<b>IV Injection:</b> Inject over 5 minutes  <b>Intermittent IV Infusion:</b> Dilute the dose in 50–200 mL of sodium chloride 0.9 % and infuse over 15 to 30 minutes	<ul style="list-style-type: none"> <li>• Contraindicated in patients with immediate hypersensitivity to penicillins, carbapenems and cephalosporin antibiotics</li> </ul>
<b>metronidazole</b>	Infusion bag: 500 mg/100 mL	Reconstitution not required	<b>Intermittent IV Infusion:</b> Infuse 500 mg undiluted over 20 minutes (rate of 25 mg/minute)	
<b>moxifloxacin</b>	Infusion bag or bottle: 400 mg/250 mL	Reconstitution not required	<b>Intermittent IV Infusion:</b> Infuse undiluted over 60 minutes	
<b>piperacillin + tazobactam</b>	Vial: 4.5 g	Add 20 mL water for injection	<b>Intermittent IV Infusion:</b> Dilute the dose in 50 mL sodium chloride 0.9%. Infuse over 20 to 30 minutes	<ul style="list-style-type: none"> <li>• Contraindicated in patients with immediate hypersensitivity to penicillins, carbapenems and cephalosporin antibiotics</li> <li>• Reconstituted solution may take 5 to 10 minutes of constant shaking to dissolve</li> </ul>

Medication	Presentation	Reconstitution fluid/volume	Administration	Notes
<b>tobramycin</b>	Ampoule: 80 mg/2 mL	Reconstitution not required	<b>Intermittent IV Infusion:</b> Dilute the dose in 50-100 mL of sodium chloride 0.9% and infuse over 20 to 30 minutes	<ul style="list-style-type: none"> <li>• Dose obese patients (BMI &gt; 30) using ADJUSTED BODYWEIGHT</li> <li>• Tobramycin is inactivated by penicillin and cephalosporin antibiotics. Do not mix in the same injection or infusion solution. Administer at separate sites if possible</li> <li>• Therapeutic drug monitoring may be required for use beyond 48 hours</li> <li>• Potential for ototoxicity and nephrotoxicity, adjustment required in renal impairment</li> </ul>
<b>trimethoprim + sulfamethoxazole</b>	Ampoule: 80 mg + 400 mg /5 mL	Dilute each ampoule in at least 125 mL of sodium chloride 0.9% (see notes)	<b>Intermittent IV Infusion:</b> Infuse over 60 to 90 minutes	<ul style="list-style-type: none"> <li>• Dilute 1 ampoule (5 mL) in 125 mL sodium chloride 0.9%</li> <li>• Dilute 2 ampoules (10 mL) in 250 mL sodium chloride 0.9%</li> <li>• Dilute 3 ampoules (15 mL) in 500 mL sodium chloride 0.9% and so forth</li> <li>• In critical care settings may be given undiluted through a central venous catheter</li> </ul>
<b>vancomycin</b>	Vial: 500 mg 1 g	500 mg vial: Add 10 mL water for injection  1 g vial: Add 20 mL water for injection	<b>Intermittent IV Infusion:</b> Dilute the dose to 5 mg/mL with sodium chloride. For example, dilute a 500 mg dose with 100 mL and 1 g dose with 200 mL sodium chloride 0.9% and infuse over at least 60 minutes.  For doses over 1 g, increase the infusion time by 30 minutes for each additional 500 mg i.e. 1.5 g over 1.5 hours and 2 g over 2 hours  For fluid-restricted patients, maximum concentration is 10 mg/mL	<ul style="list-style-type: none"> <li>• Infusion related effects (for example pain at the injection site and Red man syndrome) are common. If these occur, decrease infusion rate and monitor closely</li> <li>• A maximum rate of infusion of 10 mg/minute is recommended to minimise the risk of Red-man syndrome.</li> <li>• Red-man syndrome presents as tingling, flushing or rash of the face, neck and upper body, muscle spasm of the chest and back, and rarely hypotension and shock-like symptoms. If symptoms of Red-man syndrome occur, slow the rate of the infusion</li> </ul>