

Preoperative Considerations

Consider individual risk factors for every patient including the need for prophylaxis. Antibiotic choice/dose may need to be modified according to patient factors (e.g. immune suppression, presence of prostheses, allergies, renal function, obesity, malnutrition, diabetes, malignancy, infection at another site, colonisation with multi-drug resistant bacteria and available pathology).

Consider surgical wound classification (clean, clean-contaminated, contaminated, dirty-infected) when determining the need for, or choice of, antibiotic prophylaxis. Refer to [Surgical Antimicrobial Prophylaxis Prescribing Guideline](#) for further information.

Pre-existing infections (known or suspected) – if present, use appropriate treatment regimen instead of prophylactic regimen for procedure but ensure the treatment regimen has activity against the organism(s) most likely to cause postoperative infection. Adjust the timing of the treatment dose to achieve adequate plasma and tissue concentrations at the time of surgical incision and for the duration of the procedure - seek advice from ID or the AMS team if unsure.

For elective implantation of prosthetic material, consider *Staphylococcus aureus* screening (for both methicillin-susceptible and methicillin-resistant strains). If the results of screening are positive, perform decolonisation. Refer to SA Health Methicillin-resistant *Staphylococcus aureus* (MRSA): Infection prevention and control [Clinical Guideline](#).

Practice Points

Timing and administration of antibiotics

Surgical antibiotic prophylaxis must be administered before surgical incision to achieve effective plasma and tissue concentrations at the time of incision. Administration of any antibiotic after skin incision reduces effectiveness.

- > IV **cefazolin** can be given over 5 minutes and should be administered no more than 60 minutes before skin incision.
- > IV **gentamicin** can be given over 3 to 5 minutes and should be administered within 120 minutes before surgical incision.
- > IV **metronidazole** and IV **clindamycin** infusions can be given over 20 minutes. They should be fully administered within 120 minutes of surgical incision. Maximum plasma and tissue concentrations occur at the conclusion of the infusion.
- > IV **vancomycin** infusion should be given at a rate of 1g over at least 60 minutes and 1.5g over at least 90 minutes. Vancomycin should be timed to begin 15 to 120 minutes before skin incision. This ensures adequate concentration at the time of incision and allows for any potential infusion-related toxicity to be recognised before induction. The infusion can be completed after skin incision.

Dosing in patients with obesity

- > **Cefazolin:** Consider increased dose of cefazolin (3g) for adult patients weighing more than 120kg.
- > **Gentamicin:** For adult patients with a [body mass index](#) 30 kg/m² or more, use [adjusted body weight](#) (up to a maximum of 100kg) to calculate the gentamicin dose.
- > **Vancomycin:** Consider increased dose of vancomycin (1.5g) for adult patients weighing more than 80kg.

High MRSA risk (defined as history of MRSA colonisation or infection OR frequent stays or a current prolonged stay in hospital with a high prevalence of MRSA OR residence in an area or aged care facility with high prevalence of MRSA OR current residence, or residence in the past 12 months, in a correctional facility):

- > Add vancomycin

Repeat dosing

A single preoperative dose is sufficient for most procedures; however repeat intraoperative doses are advisable:

- > for prolonged surgery (more than 4 hours from the time of first preoperative dose) when a short-acting agent is used (e.g. cefazolin dose should be repeated after 4 hours and clindamycin after 6 hours), OR
- > if major blood loss occurs (e.g. more than 1500 mL in adults), following fluid resuscitation.

When measuring the time to a second intraoperative dose, measure the interval from the time of the first preoperative dose rather than the surgical incision time.

Recommended Prophylaxis

Surgery	Recommended Prophylaxis	High Risk Penicillin / Cephalosporin Allergy*
Vascular reconstructive surgery involving the abdominal aorta, carotid, upper or lower limbs (including graft/patch/stent insertion, groin incision)	cefazolin 2g IV <u>High risk of MRSA infection:</u> ADD vancomycin 1g IV infusion (1.5g for patients more than 80kg actual body weight)	vancomycin 1g IV infusion (1.5g for patients more than 80kg actual body weight) PLUS gentamicin 2mg/kg (for procedures likely to continue for longer than 6 hours, consider using a 5mg/kg dose)
Limb amputation	cefazolin 2g IV <u>PLUS for amputation of an ischaemic limb:</u> ADD metronidazole 500mg IV infusion <u>Reoperation (return to theatre or early revision) OR high risk of MRSA infection:</u> ADD vancomycin 1g IV infusion (1.5g for patients more than 80kg actual body weight)	vancomycin 1g IV infusion (1.5g for patients more than 80kg actual body weight) PLUS gentamicin 2mg/kg (for procedures likely to continue for longer than 6 hours, consider using a 5mg/kg dose) <u>PLUS for amputation of an ischaemic limb:</u> ADD metronidazole 500mg IV infusion

Recommended Prophylaxis

Surgery	Recommended Prophylaxis	High Risk Penicillin / Cephalosporin Allergy*
AVF / AVG with insertion of prosthetic material (e.g. Dacron graft) AVF / AVG revision Fasciotomy Carotid artery procedures involving prosthetic material	cefazolin 2g IV High risk of MRSA infection: ADD vancomycin 1g IV infusion (1.5g for patients more than 80kg actual body weight)	vancomycin 1g IV infusion (1.5g for patients more than 80kg actual body weight)
Brachial or carotid artery procedures not involving insertion of prosthetic material (e.g. primary autogenous AVF formation) All other clean procedures (e.g. thorascopic sympathectomy, varicose vein procedures, percutaneous thrombectomy)	Prophylaxis NOT recommended	

*High risk penicillin/cephalosporin allergy: History suggestive of high risk (e.g. anaphylaxis, angioedema, bronchospasm, urticaria, DRESS/SJS/TEN)

The safety and efficacy of intraoperative irrigation with antimicrobial solutions, or soaking surgical implants (e.g. vascular grafts, mesh) with antimicrobial solutions before insertion, has not been established. There is concern about the development of resistance; in particular, rifampicin should not be used as a single drug. There is also potential for adverse effects. Consequently, these practices cannot be recommended.

Postoperative Care

Postoperative antibiotics are NOT indicated unless infection is confirmed or suspected, regardless of the presence of surgical drains. If infection is suspected, consider modification of antibiotic regimen accordingly to clinical condition and microbiological results.

Definitions / Acronyms

AMS	Antimicrobial Stewardship	AVF	Arteriovenous fistula
AVG	Arteriovenous graft	DRESS	Drug rash with eosinophilia and systemic symptoms
ID	Infectious Diseases	IV	Intravenous
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>	SJS / TEN	Stevens-Johnson syndrome / Toxic epidermal necrolysis

References

- Antibiotic Expert Group (2019). [Therapeutic Guidelines: Antibiotic, Version 16](#). Melbourne: Therapeutic Guidelines Limited.
- Chakfe, N., et al. (2020). "European Society for Vascular Surgery (ESVS) 2020 Clinical Practice Guidelines on the Management of Vascular Graft and Endograft Infections". *Eur J Endovasc Surg* 59: 339-384.
- Chehab, M.A., et al. (2018). "Adult and Pediatric Antibiotic Prophylaxis during Vascular and IR Procedures: A Society of Interventional Radiology Practice Parameter Update Endorsed by the Cardiovascular and Interventional Radiological Society of Europe and the Canadian Association for Interventional Radiology". *J Vasc Interv Radiol* 29:1483-1501.
- Kalapatapu V. (2021). "Lower extremity amputation". In: Mills JL Snr and Eidt JF (eds), [UpToDate](#), Waltham, MA. [www.uptodate.com] Accessed March 2021
- McIntosh, J., Earnshaw, JJ. (2009) "Antibiotic prophylaxis for the prevention of infection after major limb amputation". *Eur J Vasc Endovasc Surg* 37 (6): 696 - 703.
- Schmidli, J., et al. (2018). "Vascular Access: 2018 Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS)". *Eur J Vasc Endovasc Surg* 55: 757-818.
- Stone, PA., AbuRahma, AF, Campbell, JR et al (2015). "Prospective randomized double-blinded trial comparing 2 anti-MRSA agents with supplemental coverage of cefazolin before lower extremity revascularization". *Ann Surg* 262: 495-501.

Endorsed by South Australian expert Advisory Group on Antibiotic Resistance (SAAGAR), Last reviewed and amended December 2021.

SAAGAR has endeavoured to ensure that the information in this publication is accurate at the time of writing; however, it makes no representation or warranty to this effect. SAAGAR disclaims all liability for any claims, losses, damages, costs and expenses suffered or incurred as a result of reliance on this publication.