



CLINICAL GUIDELINE

Principles of Surgical Prophylaxis

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

Version Number:	5
Does this version include changes to clinical advice:	Yes
Date Approved:	30 th January 2024
Date of Next Review:	31 st August 2026
Lead Author:	Ysobel Gourlay
Approval Group:	Antimicrobial Utilisation Committee

Important Note:

The Intranet version of this document is the only version that is maintained. Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.

Antibiotic Prophylaxis in Surgery / Procedures General Principles (Includes Gentamicin Dosing for Surgical Prophylaxis)

Timing of Antibiotic Administration

- **Single dose, IV prophylaxis** up to 60 minutes prior to skin incision/ intervention. **IM teicoplanin** in Sacral Nerve stimulation, 60 minutes prior to skin incision/ intervention.
- **Single dose, oral ciprofloxacin** 1 hour prior to procedure. **Oral co-trimoxazole** 2 hours prior to sacral nerve stimulation procedure and immediately post PEG insertion.

Gentamicin[#]

- See appendix 1 for prophylactic dosing.
- Doses of up to 600 mg gentamicin can be given undiluted by slow IV injection over 3 – 5 minutes, or diluted to 20 ml with 0.9 % saline and given slowly over 3-5 minutes, administer via large peripheral vein or central line. ¹⁻⁴
- Teicoplanin and gentamicin are **incompatible** when mixed directly and must not be mixed before injection.
- **If the patient is already prescribed gentamicin for treatment** of an infection prior to surgery – replace prophylactic gentamicin with co-amoxiclav (NB amoxicillin + metronidazole not required for prophylaxis if co-amoxiclav given). If the patient has true penicillin allergy give ciprofloxacin (see advice re gentamicin re-dosing at 8 hours).
- If subsequent treatment using gentamicin is required, measure gentamicin concentration 6-14 hours post theatre gentamicin dose, and follow GGC guidance on staffnet for gentamicin dosing. Calculate the gentamicin dose using the online calculator. Discuss with pharmacy if further advice is required (or if out of hours, the on call pharmacist).

Teicoplanin~

- Give 400- 800 mg teicoplanin by slow IV injection over 3-5 minutes.
- Teicoplanin and gentamicin are **incompatible** when mixed directly and must not be mixed before injection.
- IM teicoplanin 400 mg for sacral nerve stimulation only. Slow IM injection to a large muscle.

Ciprofloxacin[^]

- See BNF warning re the restrictions and precautions for use, due to very rare reports of disabling and potentially long-lasting or irreversible side effects of quinolones.
- If high *C. difficile* risk (e.g. previous *C. difficile* infection, Age >65 AND ≥ 1 of: frailty, severe underlying disease, prolonged hospital stay, extensive prior antibiotic exposure) avoid ciprofloxacin and discuss alternative with microbiology.
- Slow infusion into a large vein over 60 min

Additional Intra-operative Doses of Antibiotic Prophylaxis

- Prolonged procedures of more than 4 hours and or blood loss >1500 ml.

Antibiotic (route)	Procedure duration (from first antibiotic dose)		Blood loss >1500 ml (give after fluid replacement)
	Over 4 hours	Over 8 hours	
Gentamicin # (IV)		IV Co-amoxiclav 1.2g <i>Or in penicillin allergy</i> IV Ciprofloxacin^ 400mg <i>If the oral route is available: oral ciprofloxacin 500 mg can be given at 6-7 hours</i>	Once bleeding is controlled, IV Co-amoxiclav 1.2g <i>Or in penicillin allergy</i> IV Ciprofloxacin^ 400mg <i>If the oral route is available and if blood loss >1500mls: oral ciprofloxacin 500 mg can be given as soon as possible.</i>
Amoxicillin (IV)	Repeat original dose	Repeat original dose again Amoxicillin is not required if co-amoxiclav is given	Repeat original dose
Benzylpenicillin (IV)	Repeat original dose	Repeat original dose again	Repeat original dose
Cefuroxime (IV)	Repeat original dose	Repeat original dose again	Repeat original dose
Clindamycin (IV)	Repeat original dose	Repeat original dose again	Repeat original dose
Co-amoxiclav (IV)	Repeat original dose	Repeat original dose again	Repeat original dose
Flucloxacillin (IV)	Repeat original dose	Repeat original dose again	Repeat original dose
Metronidazole (IV)		Repeat original dose Metronidazole is not required if co-amoxiclav is also given	
Teicoplanin~ (IV)			Give half original dose, if ≥ 1.5L blood loss within first hour of operation.
Ciprofloxacin^ (oral)		Give single dose IV gentamicin	Give single dose IV gentamicin

If MRSA positive: decolonise prior to procedure as per NHS GGC infection control guidelines and discuss with microbiology re antibiotic choice.

CPE carriers: If identified as Carbapenamase producing Enterobacterales carriers, contact microbiology.

Weight based Dosing ⁽⁶⁾

Consider increasing the dose of co-amoxiclav as below:

	Weight > 100 Kg
Co-amoxiclav	Add 1 g IV amoxicillin to 1.2 g Co-amoxiclav

Appendix 1: Gentamicin[#] dosing regimens for surgical prophylaxis in adult male and female patients

- Avoid gentamicin if CrCl < 20 ml/min: seek advice on alternative from microbiology.
- In renal transplant patients avoid gentamicin and seek advice from microbiology or renal team.
- Use GGC CrCl calculator to assess renal function. Do not use eGFR in patients at extremes of body weight.
- Use the patient's actual body weight and height to calculate the gentamicin dose, using table below. This prophylactic gentamicin dosing table is based on approximately 5 mg/kg actual body weight/ adjusted body weight.⁵
- Doses of up to 600 mg gentamicin can be given undiluted by slow IV injection over 3 – 5 minutes, or diluted to 20 ml with 0.9 % saline and given slowly over 3-5 minutes, administer via large peripheral vein or central line. ¹⁻⁴
- Monitor for signs of extravasation or infiltration e.g. swelling, redness, coolness or blanching at the cannula insertion site.

HEIGHT \ WEIGHT	30 – 39.9 kg	40 – 49.9 kg	50 – 59.9 kg	60 – 69.9 kg	70 – 79.9 kg	80 – 89.9 kg	90 – 99.9 kg	100 – 109.9 kg	110 – 119.9 kg	120 – 129.9 kg	130 – 139.9 kg	140 – 149.9 kg	150 – 159.9 kg	160 – 169.9 kg	170 – 179.9 kg	180 – 189.9 kg	≥190 kg
142 - 146 cm 4'8" - 4'9"	180 mg	200 mg	220 mg	240 mg	260 mg	280 mg	300 mg	320 mg	340 mg	360 mg							
147 - 154 cm 4'10" - 5'0"	180 mg	200 mg	240 mg	260 mg	280 mg	300 mg	320 mg	340 mg	360 mg	380 mg	400 mg						
155 - 164 cm 5'1" - 5'4"	180 mg	200 mg	260 mg	280 mg	300 mg	320 mg	340 mg	360 mg	380 mg	400 mg	420 mg	440 mg	480 mg				
165 - 174 cm 5'5" - 5'8"		200 mg	280 mg	300 mg	320 mg	340 mg	360 mg	380 mg	400 mg	420 mg	460 mg	480 mg	480 mg	520 mg	540 mg		
175 - 184 cm 5'9" - 6'0"		200 mg	280 mg	320 mg	360 mg	380 mg	400 mg	420 mg	440 mg	460 mg	480 mg	500 mg	520 mg	540 mg	560 mg	580 mg	600 mg
185 - 194 cm 6'1" - 6'4"			280 mg	320 mg	360 mg	400 mg	420 mg	440 mg	460 mg	480 mg	500 mg	540 mg	560 mg	580 mg	600 mg	600 mg	600 mg
≥195 cm ≥6'5"				320 mg	360 mg	420 mg	460 mg	480 mg	500 mg	520 mg	540 mg	560 mg	580 mg	600 mg	600 mg	600 mg	600 mg

References

1. Metro South Antimicrobial Stewardship Network (2019) *Gentamicin Dosing, Administration & Monitoring Guidelines for Adults for Empirical Therapy*. Available at: [Fact sheet template \(portrait\) | Metro South Health \(mshprescribe.com\)](#) (Accessed: 07 July 2022).
2. Spencer S et al, Intravenous Push Administration of Antibiotics: Literature and Considerations, *Hosp Pharm*. 2018 Jun; 53(3): 157–169.
3. Loewenthal MR, Dobson PM. Tobramycin and gentamicin can safely be given by slow push. *J Antimicrob Chemother*. 2010;65(9):2049–2050.
4. Gentamicin Injection 40mg/ml SPC, eMC, ([Gentamicin 40mg/ml Solution for Injection/Infusion - Summary of Product Characteristics \(SmPC\) - \(emc\) \(medicines.org.uk\)](#)) (Accessed 30 August 2023)
5. Bratzler, D.W., Dellinger, E.P., Olsen, K.M., Perl, T.M., Auwaerter, P.G., Bolon, M.K., Fish, D.N., Napolitano, L.M., Sawyer, R.G., Slain, D., Steinberg, J.P. and Weinstein, R.A. (2013) 'Clinical practice guidelines for antimicrobial prophylaxis in surgery'. *American Journal of Health-System Pharmacy*, 70(3), pp. 195-283.
6. Co-amoxiclav SPC, [Co-Amoxiclav 1000 mg/200 mg Powder for Solution for Injection/Infusion - Summary of Product Characteristics \(SmPC\) - \(emc\) \(medicines.org.uk\)](#) (Accessed 30 August 2023)