

# Waterford: Antimicrobial Guidelines - Antimicrobial Guideline: Appendices

## Appendix 1: South East Regional Orthopaedic Service Antibiotic Prophylaxis For Open Fractures

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#### PHASE 1 : Within 1 hour of injury and continue until wound excision

Antibiotic Regimen should be administered as soon as possible after the injury:

- **Cefuroxime** 1.5 g IV TDS plus **Metronidazole** 500 mg IV TDS until time of first debridement.
- **In case of IgE-mediated /severe penicillin allergy/anaphylaxis:** Use **Clindamycin** 600mg-1.2g QDS IV plus **Gentamicin** 3mg/kg once daily IV. Patients with non-severe penicillin allergy (mild / rash only and no history of severe reaction / anaphylaxis / angioedema), a cephalosporin such as **Cefuroxime** is considered safe and is the agent of choice.
- In the case of open fractures of the distal phalanx of the finger use **Cefuroxime** 1.5g TDS IV only – (in case of severe penicillin allergy/anaphylaxis use **Clindamycin** 600mg-1.2g QDS IV).
- If history or high risk of **MRSA** colonisation / infection add **Vancomycin** 15mg/kg (max 2g) to the antibiotic regimens.
- In the case of heavily contaminated wounds, e.g. farmyard injuries or injuries with vascular insufficiency or Gustilo Grade III fractures, add **Gentamicin** 3 mg/kg IV once daily to antibiotic regimen on initial presentation. At the time of first debridement and stabilisation, ensure prophylaxis of **Cefuroxime** 1.5 g IV and **Metronidazole** 500 mg IV is given; in addition give **Gentamicin** 3 mg/kg IV stat pre-operatively (unless Gentamicin has been given in the past 16 hours).
- Antibiotics after wound excision should continue for 24 hours .

#### PHASE 2:

- At the time of definitive skeletal stabilisation and definitive soft tissue coverage the patient should receive a single intravenous dose at induction of **Vancomycin** 15mg/kg (max 2g) (if it has been more than 12 hour since the last dose) plus **Gentamicin** 3 mg/ kg (if it has been more than 16 hours since the last dose).

Reference: Eccles S, et al. Standards for the management of open fractures. Oxford University Press; 2020.

## Appendix 2: Post-Splenectomy Prophylaxis in Adults

### Appendix 2: Post-Splenectomy Prophylaxis in Adults

**Note: These guidelines are intended for use in adult patients only. For immunisation schedule for children with splenectomy or hyposplenism seek expert advice and refer to National Immunisation Guidelines.**

- Individuals with an absent or dysfunctional spleen are at increased of fulminant infection especially from encapsulated bacteria such as *Streptococcus pneumoniae*, *Neisseria meningitidis* and *Haemophilus influenzae*.
- Patients should be encouraged to wear an alert bracelet or equivalent and carry a card with information about their condition. Patients should be educated about the risks of animal exposure including bites and potential risks of tick and mosquito-borne diseases when travelling.
- It is essential to educate patients regarding the risk of infection, the importance of vaccines and antimicrobial prophylaxis, and prompt recognition and treatment of any infections that develop.

#### Vaccination

- For those requiring splenectomy, vaccination should be completed at least 2 weeks and preferably 4 weeks or more before surgery.
- In the case of emergency splenectomy, or if immunisation was not completed pre-operatively, vaccination can be commenced 2 weeks post operatively.
- Advise general practitioner in discharge letter of requirement for these vaccines.
- In immunocompromised patients, seek expert advice regarding timing of vaccination.

Additional vaccines for those with asplenia or hyposplenism		
<i>Neisseria meningitidis</i>	MenACWY	2 doses 2 months apart; booster every 5 years
	MenB	1 unvaccinated, 2 doses 1 month apart
<i>Streptococcus pneumoniae</i>	PCV13 <sup>a</sup>	1 dose ≥ 2 months after previous dose.
	PPV23 <sup>b</sup>	1 unvaccinated, 2 doses 2 months apart 1 - 3 doses 1st dose at least 2 months after PCV13 2nd dose 5 years later Final dose at >65 years
<i>Haemophilus influenzae</i> type b	Hib	1 dose > 2 months after previous dose.
Influenza	Inactivated influenza	Annually

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\* Please refer to *National Immunisation Guidelines Chapter 16 Pneumococcal Infection* . PCV13 should be given first, followed by PPV23 at least 2 months later.

### Antimicrobial Prophylaxis

The increased risk of infection is life-long but is highest early after splenectomy. The risk is greatest in children up to the age of 16 years and in adults over 50 years.

**Lifelong** prophylactic antibiotics should be offered to patients considered at continued **high risk** of pneumococcal infection:

- age less than 16 years or greater than 50 years
- inadequate serological response to pneumococcal vaccination
- a history of previous invasive pneumococcal disease
- splenectomy for underlying haematological malignancy particularly in the context of on-going immunosuppression

Antibiotic prophylaxis is recommended for a minimum of **1 to 2 years in low risk patients** but these patients should be counselled regarding the risks and benefits of lifelong antibiotics and may choose to continue or discontinue prophylaxis.

Oral penicillin is the drug of choice

- Penicillin V (Calvepen™) 666mg po q12h OR amoxicillin 250-500mg q12h po
- In patients with confirmed penicillin allergy, clarithromycin 250 mg bd po is an alternative option.

Consider interactions with other drugs and consult with hospital pharmacist if necessary.

**Note:** Patients developing symptoms and/or signs of infection, despite the above measures, must be given systemic antibiotics and admitted urgently to hospital.

### References:

1. National Immunisation Advisory Committee. The Immunisation Guidelines for Ireland: Chapter 3 Immunisation of Immunocompromised Persons March 2022– accessed at [www.immunisation.ie](http://www.immunisation.ie)
2. National Immunisation Advisory Committee. The Immunisation Guidelines for Ireland: Chapter 16 Pneumococcal infection– accessed at [www.immunisation.ie](http://www.immunisation.ie)
3. Davies, John M., et al. "Review of guidelines for the prevention and treatment of infection in patients with an absent or dysfunctional spleen: Prepared on behalf of the British Committee for Standards in Haematology by a Working Party of the Haemato-Oncology Task Force." *British journal of haematology* 155.3 (2011): 308-317.

### Appendix 3: Penicillin Allergy

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# Penicillin Allergy Antibiotic Prescribing Aid

Penicillin hypersensitivity reactions classified by severity and timing of onset:

Onset	Severe Reaction	Non- Severe Reaction
<b>Immediate</b> <i>Typically minutes to hours after drug exposure</i>	IgE-mediated reaction: Anaphylaxis, angioedema, acute urticaria, wheeze/airway swelling/bronchospasm, hypotension, collapse	Mild rash
<b>Delayed</b> <i>Typically days to weeks after drug exposure</i>	Severe generalised skin reactions: Stevens-Johnson Syndrome (SJS), Toxic Epidermal Necrolysis (TEN), Drug Rash with Eosinophilia and Systemic Symptoms (DRESS) or significant internal organ involvement, Acute Generalised Exanthematous Pustulosis (AGEP)	
	<b>AVOID:</b> Penicillins, Cephalosporins, Carbapenems	<b>AVOID:</b> Penicillins <b>USE WITH CAUTION:</b> Cephalosporins, Carbapenems

**CONTRAINDICATED**

AVOID in SEVERE & NON-SEVERE penicillin reaction

Common antimicrobials listed – list is not exhaustive

## Penicillins

- Amoxicillin (Amoxil®)
- Ampicillin
- Benzylpenicillin (Crystapen®)
- Amoxicillin/clavulanic acid (Augmentin®)
- Flucloxacillin (Floxapen® Flucillin®)
- Phenoxymethylpenicillin (Calvepen® Kopen®)
- Piperacillin/tazobactam (Tazocin®)

Common antimicrobials listed – list is not exhaustive

## Cephalosporins

- Cefaclor (Distaclor®)
- Cefalexin (Keflex®)
- Cefazolin
- Cefotaxime (Claforan®)
- Ceftaroline (Zinforo®)
- Ceftazidime (Fortum®)
- Ceftazidime/avibactam (Zavicefta®)
- Ceftriaxone (Rocephin®)
- Cefuroxime (Zinnat® Zinacef®)

## Carbapenems

- Ertapenem (Invanz®)
- Meropenem
- Meropenem/vaborbactam (Vaborem®)

## Monobactams

- Aztreonam (Azactam®) May be used in penicillin allergy unless allergic to 3<sup>rd</sup> generation cephalosporin i.e. ceftazidime, when its use should be considered with caution

**CAUTION**

AVOID in SEVERE penicillin allergy  
USE with caution in NON-SEVERE penicillin reaction

Record allergies carefully on the patient's drug chart and medical notes. Check with the patient AND the allergy section of the drug chart before prescribing and administering antibiotics.

South East AMS Group June 2024

\*\* It is important to document exactly what symptoms occurred before deciding if a patient is truly penicillin allergic. Check with Patient / Relatives / GP / Community Pharmacist to clarify the nature of allergic reaction.\*\*

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- Many patients are **misdiagnosed** as being penicillin allergic.
- An incorrect diagnosis of penicillin allergy leads to unnecessary avoidance of this relatively non-toxic class of drugs, exposes the patient to potentially more toxic drugs, increases health care costs and contributes to the development of antibiotic resistance.
- Patients are often labelled as having a hypersensitivity reaction when in fact a patient may be experiencing a side effect of penicillin, such as gastrointestinal upset (e.g. nausea, diarrhea) or headache.
- Other concomitant medicines can also be responsible for triggering a hypersensitivity reaction. Therefore, it is important to consider the timeframe over which the hypersensitivity reaction has developed relative to the initiation of different medications.
- Patients who have previously presented with a less severe penicillin allergy (e.g. mild-moderate rash not on the EM/SJS/TEN spectrum of rash and not requiring hospitalisation) **may** be considered to be prescribed cephalosporins/carbapenems **if the benefits outweigh the risks** of cross reactivity. This is a clinical risk assessment. The potential for an allergic reaction should be monitored and resuscitation equipment available if required.
- However, patients who are documented as having experienced a severe reaction (e.g. anaphylaxis) from a penicillin should not be prescribed cephalosporins, carbapenems and other beta-lactam containing antibiotics where acceptable alternatives available. A risk-benefit assessment may be needed in certain circumstances. Discuss individual case with senior clinician and clinical microbiology team if needed.

Please see HSE guidelines for Antibiotic Allergy with a special reference to Penicillin and Beta Lactam Allergy for further information

<https://www.hse.ie/eng/services/list/2/gp/antibiotic-prescribing/drug-interactions/guidelines-for-antibiotic-allergy-with-special-reference-to-penicillin-and-beta-lactam-a>

#### Appendix 4: Prophylaxis Pre-TRUS Guided Prostate Biopsy

## Appendix 4: Prophylaxis Pre-TRUS Guided Prostate Biopsy

Antimicrobial prophylaxis is recommended for ALL patients undergoing TRUS-guided prostate biopsy

The figures below outline the recommended approach.

Patients with a history of colonisation/infection or with risk factors for CRE/CPE (Carbapenem Resistant Enterobacterales/ Carbapenemase Producing Enterobacterales) should be screened in advance with a rectal swab for CRE/CPE carriage and not listed for TRUS-guided prostate biopsy pending CRE/CPE screening results.

Risk factors may include but are not limited to:

- History of fluoroquinolone use in the previous six months
- Patient is a healthcare worker
- Previous sepsis/infection following TRUS-guided prostate biopsy
- History of antimicrobial resistant Enterobacterales colonisation/infection (e.g., ESBL, fluoroquinolone and/or aminoglycoside resistance)
- Other risk factors as per local policy

If the results of CRE/CPE screening are positive, it is recommended that the multi-disciplinary team (MDT) discuss the optimal strategy for performing the prostate biopsy safely in this patient.

Thereafter there are two recommended options (2a and 2b in Figure 1):

Oral ciprofloxacin 750mg as a one drug antimicrobial prophylaxis regimen for patients *without* risk factors for colonisation with resistant Enterobacterales .

Patients with risk factors for antimicrobial resistant Enterobacterales (other than CRE/CPE) should be given a two drug antimicrobial prophylaxis regimen.

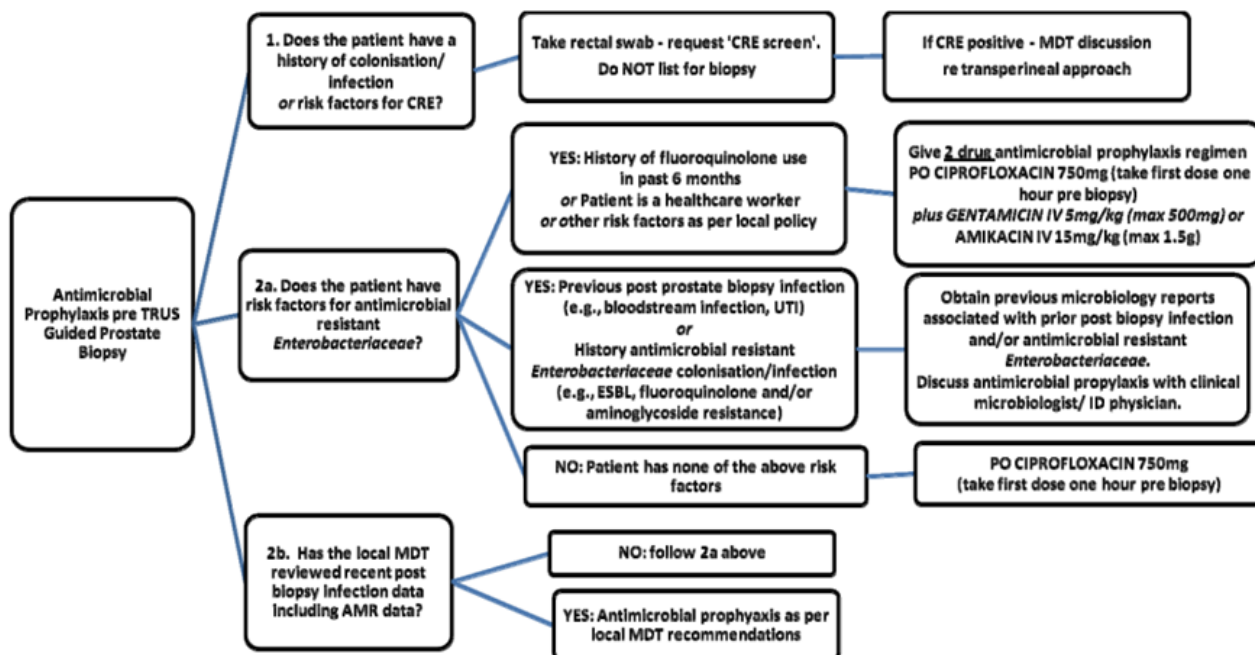
A combination of ciprofloxacin and an aminoglycoside is recommended (unless the patient has a history of previous microbiology results indicating resistance to fluoroquinolones and/or aminoglycosides, in which case the prophylaxis choice should be discussed with the local Clinical Microbiologist

Before prescribing antimicrobial prophylaxis, it is important to document if the patient has an antimicrobial allergy and calculate the Creatinine Clearance (CrCl) for adjustment of dosing/therapy in renal impairment.

**Please note important safety information, cautions and contraindications if prescribing a quinolone including risk of tendon damage, seizures & prolonged QT interval. Please see European Medicines Agency review for further details**

<https://www.ema.europa.eu/en/medicines/human/referrals/quinolone-fluoroquinolone-containing-medicinal-products>

Figure 1



**Table 1: Empiric Antimicrobial Prophylaxis for patients undergoing TRUS-guided prostate biopsy**  
12,14,15,18,19

Drug	Route	Does if normal function	Adjust in renal impairment	How long before biopsy?	Duration
<b>Ciprofloxacin</b>	PO	750mg	none	1 hour	one further dose 12 hours post-biopsy
<sup>‡</sup> <b>Gentamicin</b>	IV	5mg/kg (max 500 mg)	*use alternative if CrCl <30ml/min	30 minutes <sup>§</sup>	single dose
<sup>‡</sup> <b>Amikacin</b>	IV	15mg/kg (max 1.5g)	*use alternative if CrCl <30ml/min	30 minutes <sup>§</sup>	single dose

<sup>‡</sup> Consult local policy for details of administration of intravenous gentamicin or amikacin.

\*If renal impairment (CrCl < 30ml/min) or contra-indication to aminoglycoside use, consult clinical microbiologist/infectious diseases physician for advice.

<sup>§</sup> Note, the timing of the end of the infusion should coincide with commencement of biopsy.

Adapted from: NCCP National Prostate Biopsy Infection Project Board

NCCP&HSE. National Policy on the Prevention and Management of Infection Post Trans Rectal Ultrasound (TRUS) Guided Prostate Biopsy 2014

Available from:

<https://www.hse.ie/eng/services/list/5/cancer/pubs/guidelines/nccp%20management%20of%20infection%20post%20trus%20biopsy%20policy%20document.pdf>