National Antimicrobial Prescribing Survey

Osteomyelitis

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Introduction

Osteomyelitis is an infection of the bone that can cause progressive inflammation and tissue destruction. The condition may be acute or chronic depending on the duration of illness and the extent of bone damage present.

Acute osteomyelitis typically presents with symptoms including pain, fever and tenderness of the affected area. Infection may occur through haematogenous spread from bloodstream infections, adjacent soft tissue infection, or direct contamination from trauma or surgery. Persistent or recurrent infection over several months may progress to chronic osteomyelitis, characterised by sinus tract development, bone necrosis and involucrum (new bone formation surrounding infected bone).

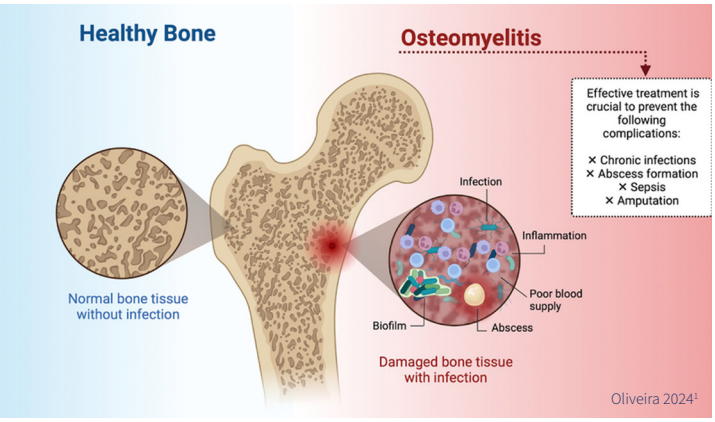
Common pathogens

The commonly implicated pathogens differ between adults and children. In adults, most infections are due to *Staphylococcus aureus* although other organisms, such as Gram-negative bacteria, may also be implicated. In children, causative organisms differ by patient age, anatomical location and concurrent medical conditions, however are most commonly *Staphylococcus aureus* and *Kingella kingae* (in children 6 months to 5 years of age). *Haemophilus influenzae* type b (Hib) may also be implicated in children who are not fully vaccinated against Hib, although this is rare in Australia due to high vaccination rates.

Diagnosis

Diagnosis is often suggested by history and characteristic imaging changes on X-ray, CT or MRI, depending on the duration of infection. Clinical samples are often used for microbiological culture and susceptibility. Blood cultures should be taken for patients with acute osteomyelitis. If blood cultures are negative or results questionable, bone or pus samples may be required for culture and histopathology.

All patients with osteomyelitis should receive specialist infectious diseases advice to guide diagnosis and management.



Recommended antimicrobial therapy

Treatment of osteomyelitis is complex and should be guided by microbiology and susceptibility results. Empiric regimens differ in their choice and duration depending on the site of infection, concomitant illnesses, the presence of prosthetic material and likelihood of methicillin-resistant *Staphylococcus aureus* (MRSA) infection.

- Antimicrobials typically comprise **flucloxacillin, cefazolin, or vancomycin**. Additional spectrum of activity against Gram-negative organisms or anaerobes may be required.
- Duration of therapy ranges between 6-12 weeks in adults. In children, durations are typically shorter with uncomplicated cases usually requiring a total duration of 3-4 weeks[2]. Longer durations may be required for some patients, for example, undrained collections or resistant infections.

For detailed treatment recommendations, refer to the *Therapeutic Guidelines*[3] or seek input from a specialist infectious diseases clinician.

Oral therapy

The evidence for oral antibiotics in the treatment of osteomyelitis has shifted substantially in recent years[4,5]. For adults, it is generally accepted that the first 7 days of treatment should be administered intravenously. For children, a switch to oral antibiotics may be considered after 2-3 days of intravenous treatment[5]. Consider an intravenous-to-oral switch if the patient is haemodynamically stable and tolerating oral intake.

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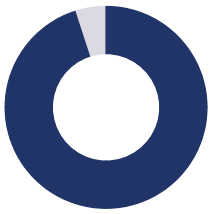
Risks of inappropriate antimicrobial use

- Prolonged infection or treatment failure leading to destruction of bone tissue
- Antimicrobial adverse effects or toxicity
- Greater healthcare burden and cost
- Antimicrobial resistance

Hospital NAPS 2015 – 2024

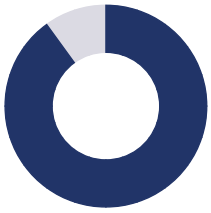
(Adult data)

4,189 prescriptions



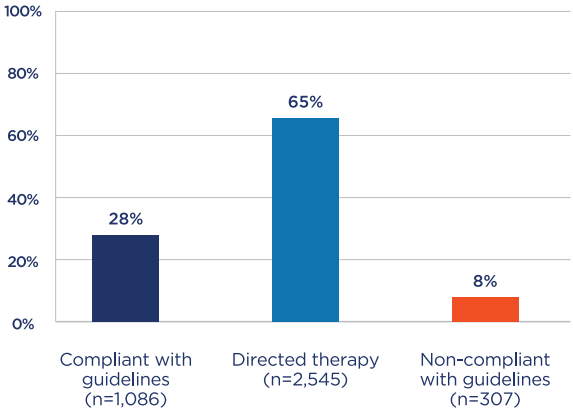
94% of prescriptions had an **indication documented**

69% of prescriptions had a **review** or **stop date documented**

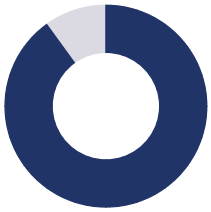


92% of prescriptions were **compliant** with guidelines or **directed** according to microbiology results*

Guideline compliance*

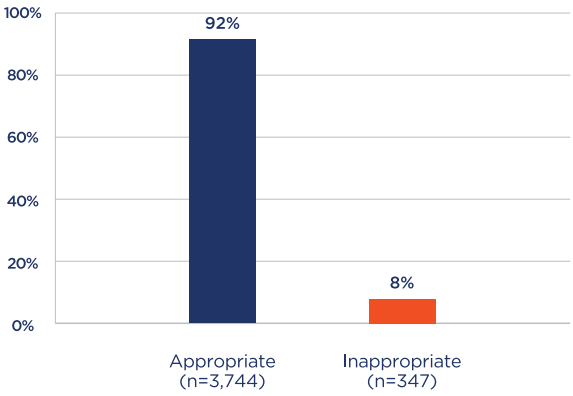


*Excludes prescriptions that were deemed not assessable (n=90) or where no guidelines were available (n=161)



92% of prescriptions were **appropriate#**

Appropriateness#



#Excludes prescriptions that were deemed not assessable (n=98)

NAPS National Antimicrobial Prescribing Survey

NCAS National Centre for Antimicrobial Stewardship

RMH GUIDANCE GROUP

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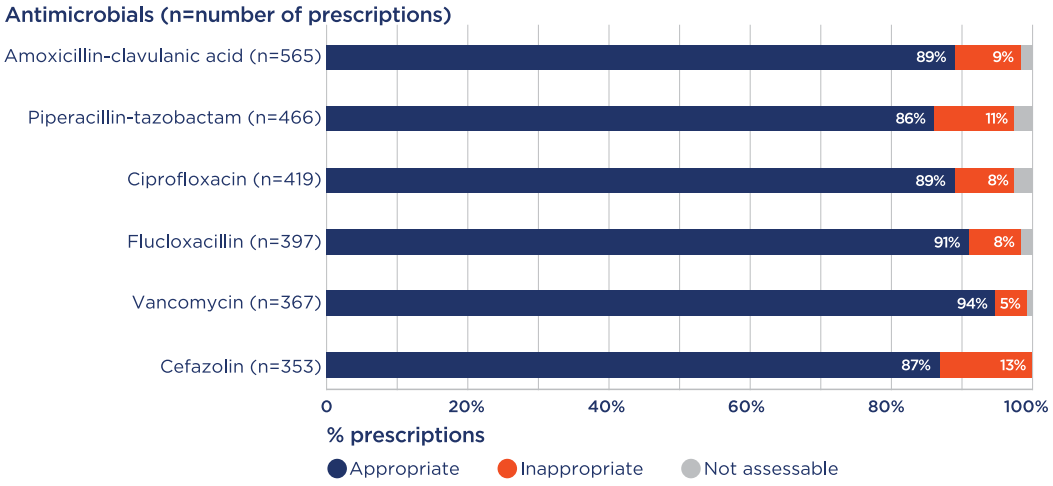
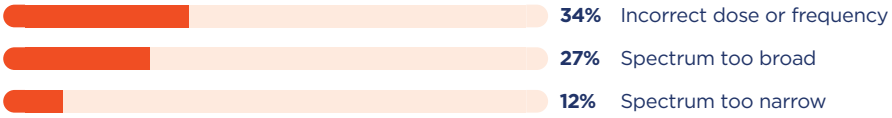
Osteomyelitis

Most common antimicrobials and prescribing appropriateness



8% (347 prescriptions) were deemed inappropriate

Common reasons for inappropriate prescribing:



Limitations to the data

These data capture prescriptions for osteomyelitis as a single condition and do not contain structured information regarding the site of infection, disease severity or causative pathogens.

The data are derived from point prevalence audits and hence some important clinical factors influencing antimicrobial selection may not be captured.

In children

Total 146 prescriptions

- 97% of prescriptions had an **indication** documented
- 57% of prescriptions had a **review or stop date** documented
- 83% of prescriptions were **compliant** with guidelines or directed according to microbiology results*
  *Excludes prescriptions that were deemed not assessable (n=4) or where no guidelines were available (n=5)
- 89% of prescriptions were deemed **appropriate#**
  #Excludes prescriptions that were deemed not assessable (n=3)

The three most commonly prescribed antimicrobials were:

- **Flucloxacillin** – 90% appropriate (47 of 52 prescriptions)
- **Cefazolin** – 84% appropriate (32 of 38 prescriptions)
- **Clindamycin** – 92% appropriate (11 of 12 prescriptions)

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Implications for clinical practice

Osteomyelitis is a serious and difficult to treat condition – all patients should receive specialist infectious diseases advice to guide diagnosis and management.

Based on 10 years of Hospital NAPS data, antimicrobial therapy for osteomyelitis was generally very well managed with over 90% of prescriptions deemed appropriate.

Whilst the indication was generally very well documented in the patient medical history, approximately one-third of prescriptions lacked a documented review or stop date. This is important to ensure clear communication between healthcare providers and documenting these prompts timely reassessment of therapy, reducing the risk of unnecessarily prolonged courses, avoidable toxicity, and supports appropriate de-escalation or IV-to-oral switch.

Of note, broad spectrum antimicrobials with Gram-negative activity featured prominently in the top 5 most commonly prescribed antimicrobials for osteomyelitis in adults. The high rates of appropriateness suggest the presence of other complicating comorbidities in this hospital patient cohort (e.g. diabetic foot infections or other healthcare-associated infections causing polymicrobial infections). Nonetheless, treatment should be narrowed where possible based on microbiological findings to minimise unnecessary broad spectrum antimicrobial use.

About the NAPS

The National Antimicrobial Prescribing Survey (NAPS) program consists of standardised audits that assist hospitals, residential aged care homes, and other health services to assess the quality of their antimicrobial prescribing practices.

The program is delivered and coordinated by the Royal Melbourne Hospital Guidance Group and the National Centre for Antimicrobial Stewardship. The NAPS program contributes to the Antimicrobial Use and Resistance in Australia surveillance program, with funding provided by the Australian Centre for Disease Control.

To learn more about the program, visit: www.ncas-australia.org/National_Antimicrobial_Prescribing_Survey
For support, contact the NAPS support team via email: support@naps.org.au

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5. Lima JPC, Chagas KA, Oliveira LBP, Filho BSB, Vital FMR. Oral versus intravenous antibiotics for bone and joint infections: Systematic review and meta-analysis of randomized controlled trials. Bone. 2025;196:117494.

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