Antibiotic use in New Zealand is higher per head of population than in many similar developed countries. Increased antibiotic use (and misuse) leads to the development of resistance by eliminating antibiotic-susceptible bacteria and leaving antibiotic-resistant bacteria to multiply. Antimicrobial stewardship aims to limit the use of antibiotics to situations where they deliver the greatest clinical benefit. Along with infection control, this is the key strategy to counter the emerging threat of antimicrobial resistance.

General principles of antimicrobial stewardship:

1. In most cases, only prescribe antibiotics for bacterial infections if:
   - Symptoms are significant or severe
   - There is a high risk of complications
   - The infection is not resolving or is unlikely to resolve
2. Select the first-line indicated antibiotic at the recommended dose and duration
3. Reserve broad spectrum antibiotics for indicated conditions only
4. Educate patients about responsible use of antibiotics, including when an antibiotic is not indicated, and the importance of adhering to the advised regimen (dose and duration); discuss ways that palatability issues or minor adverse effects can be minimised and tips for remembering to take doses on time

For further reading, see: *Antibiotics: the future is short*

**Notes for using this guide**

**Disclaimer:** The following information is a “living document”; information is updated as new evidence or recommendations emerge. It is intended to aid selection of an appropriate antibiotic for typical patients with infections commonly seen in primary care. Local resistance patterns may mean that there will be regional variation in first-line choices.

Information on national antimicrobial resistance patterns is available from the Institute of Environmental Science and Research Ltd (ESR), Public Health Surveillance

Regional resistance patterns may vary; check with your local laboratory

To check the funding status of a medicine and any supply issues, refer to the New Zealand Formulary or the Pharmaceutical Schedule

This guideline distinguishes child and adult dosing where appropriate. ‘Child’ for the purpose of this guideline refers to those aged > 1 month and < 12 years, unless otherwise specified. For dosing relating to neonates aged < 1 month, refer to the New Zealand Formulary for Children

Further information relating to isolation periods and reporting of patients with Notifiable Diseases (and their contacts) can be found in the Communicable Diseases Control Manual or alternatively discuss with Public Health

Infectious diseases medicine is a dynamic and evolving discipline; this guide is a “living document” and any major changes in antibiotic choice, dose or management will be updated online as required. If you would like to suggest any changes to the guide or the addition of topics, email: editor@bpac.org.nz

The information in this publication is specifically designed to address conditions and requirements in New Zealand and no other country. bpacnz assumes no responsibility for action or inaction by any other party based on the information found in this publication and readers are urged to seek appropriate professional advice before taking any steps in reliance on this information.
The following main resources were used in the development of this guide:

2. Dermnet NZ. Available from: [dermnetnz.org](http://dermnetnz.org)

Acknowledgements

bpac® would like to thank all of the infectious diseases experts and other clinicians who have provided review and comment on this resource since it was first published in 2011.

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For an electronic version of this guide see: [www.bpac.org.nz/antibiotics](http://www.bpac.org.nz/antibiotics)
**Respiratory**

### COPD – acute exacerbations

<table>
<thead>
<tr>
<th>Management</th>
<th>Antibiotic treatment is usually only necessary for patients with moderate to severe signs and symptoms of infection. Approximately half of COPD exacerbations are triggered by viruses rather than bacteria. Antibiotic treatment is more likely to be helpful in patients with clinical signs of chest infection (e.g. purulent sputum and increased shortness of breath and/or increased volume of sputum) and those with more severe airflow obstruction at baseline.</th>
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<th>Common pathogens</th>
<th>Respiratory viruses, <em>Streptococcus pneumoniae</em>, <em>Haemophilus influenzae</em>, <em>Moraxella catarrhalis</em></th>
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<table>
<thead>
<tr>
<th>Antibiotic treatment</th>
<th>Acute exacerbation of COPD with moderate to severe signs of infection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First choice</strong></td>
<td>Amoxicillin</td>
</tr>
<tr>
<td>Adult: 500 mg, three times daily, for five days*</td>
<td></td>
</tr>
<tr>
<td>* Longer courses may not provide additional clinical benefit</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Doxycycline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult: 200 mg, on day one (loading dose), followed by 100 mg, once daily, on days two to five*</td>
<td></td>
</tr>
</tbody>
</table>
**Pertussis (whooping cough)**

### Management
Antibiotic treatment is recommended to reduce transmission, if initiated within three weeks of the onset of the cough; after this time most people are no longer infectious.

Antibiotic treatment is also recommended if the duration of the cough is unknown, and for pregnant women with pertussis.

Prophylactic antibiotics are recommended for high risk contacts: children aged less than one year and their caregivers, pregnant women and people at risk of complications, e.g. severe asthma, immunocompromised.

Antibiotic treatment is unlikely to alter the clinical course of the illness, unless given within the first few days of contracting the infection. However, as initial symptoms are often indistinguishable from a minor respiratory infection, antibiotics are not usually considered early on unless there is reason to suspect pertussis infection, e.g. family contacts.

Patients should be advised to avoid contact with others, especially infants and children, until at least five days of antibiotic treatment has been taken. Children with pertussis can deteriorate rapidly and may require hospitalisation.

Pertussis is a Notifiable Disease. Suspected cases must be notified to the Medical Officer of Health. Check with the local Medical Officer of Health as to whether laboratory testing is appropriate.

### Common pathogens
* Bordetella pertussis

### Antibiotic treatment

<table>
<thead>
<tr>
<th>Pertussis symptoms &lt; 3 weeks or high risk contact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First choice</strong></td>
</tr>
<tr>
<td>Azithromycin *</td>
</tr>
<tr>
<td>Child &lt; 45 kg: 10 mg/kg/dose, once daily, on day one, followed by 5 mg/kg/dose, once daily, on days two to five</td>
</tr>
<tr>
<td>Adult and child &gt; 45 kg: 500 mg on day one, followed by 250 mg, once daily, on days two to five</td>
</tr>
</tbody>
</table>

* Macrolide antibiotics are associated with a risk of development of hypertrophic pyloric stenosis in infants aged under two weeks. However, the benefits of treating pertussis outweigh this risk; azithromycin is the preferred macrolide during pregnancy, lactation and in infants aged < 1 month.

<table>
<thead>
<tr>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythromycin</td>
</tr>
<tr>
<td>Child: 10 mg/kg/dose, four times daily, for 14 days</td>
</tr>
<tr>
<td>Adult: 400 mg, four times daily, for 14 days</td>
</tr>
</tbody>
</table>

* See note above re. macrolides

<table>
<thead>
<tr>
<th>Trimethoprim + sulfamethoxazole † (for adults and children aged &gt; 6 weeks allergic to macrolides)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child: 24 mg/kg/dose, twice daily, for 14 days</td>
</tr>
<tr>
<td>Adult: 960 mg (two tablets), twice daily, for 14 days</td>
</tr>
</tbody>
</table>

† Formerly referred to as co-trimoxazole oral liquid 40+200 mg/5 mL or co-trimoxazole tablets 80+400 mg; now expressed as the total dose of trimethoprim + sulfamethoxazole (ratio 1:5) – 240 mg/5 mL oral liquid or 480 mg tablets. N.B. avoid in infants aged under six weeks, due to the risk of hyperbilirubinaemia.
**Pneumonia – adult**

**Management**

Antibiotic treatment is appropriate for all adults with suspected pneumonia.

Adults with pneumonia may present with symptoms and signs specific to the chest, or less specific respiratory and systemic symptoms, e.g. confusion (particularly in elderly people). Consider referral to hospital for patients with one or more of the following features: co-morbidities, altered mental state, respiratory rate >30/min, pulse rate >125/min, \(O_2\) saturation ≤92%, BP systolic <90 mm Hg or diastolic <60 mm Hg, age > 65 years, lack of reliable observation at home.

Chest x-ray is not routinely recommended in a community setting. It may be appropriate when the diagnosis is unclear, there is dullness to percussion or other signs of an effusion or collapse, or when the likelihood of malignancy is increased, such as in a smoker aged over 50 years.

**Common pathogens**

*Streptococcus pneumoniae, Haemophilus influenzae, Mycoplasma pneumoniae, Chlamydophila pneumoniae, Legionella pneumophila, Staphylococcus aureus*, respiratory viruses

N.B. Patients can generally be adequately treated with an antibiotic that covers *S. pneumoniae*.

**Antibiotic treatment**

**Suspected or confirmed pneumonia**

**First choice**

**Amoxicillin**

*Adult*: 500 mg – 1 g, three times daily, for five to seven days

If atypical organisms are suspected, e.g. *M. pneumoniae*, *C. pneumoniae* or *L. pneumophila*, or if the patient has not improved after 48 hours, **add either:**

- **Roxithromycin** 300 mg, once daily, for seven days; or
- **Doxycycline** 200 mg, twice daily, on day one, followed by 100 mg, twice daily, from days two to seven

**Alternatives**

Monotherapy with **roxithromycin** or **doxycycline** is acceptable for people with a history of penicillin allergy.

N.B. Ciprofloxacin should not be used as it does not reliably treat infections due to *S. pneumoniae*.  

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## Pneumonia – child

### Management
Antibiotic treatment is appropriate for all children with suspected pneumonia. Children with pneumonia may present with a range of respiratory symptoms and signs; fever, tachycardia and increased respiratory effort are more common, auscultatory signs are less common. Consider referral to hospital for a child with any of the following features: age < 6 months, drinking less than half their normal amount, oxygen saturation ≤ 92% on air, increased respiratory effort, temperature < 35°C or > 40°C, decreased breath sounds or dullness to percussion, lack of reliable observation at home.

In addition, if there is no response to treatment in 24 – 48 hours, review diagnosis and consider referral to hospital. Chest x-ray is not routinely recommended in a community setting. It may be appropriate when the diagnosis is unclear, there is dullness to percussion or other signs of an effusion or collapse or the history is suggestive of foreign body aspiration.

### Common pathogens
- *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Mycoplasma pneumoniae*, *Staphylococcus aureus*, respiratory viruses

### Antibiotic treatment
#### Suspected or confirmed pneumonia

<table>
<thead>
<tr>
<th><strong>First choice</strong></th>
<th><strong>Amoxicillin</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child</strong></td>
<td>25 – 30 mg/kg/dose, three times daily, for five to seven days (maximum 500 mg/dose age three months to five years, 1000 mg/dose age &gt; five years)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Alternatives</strong></th>
<th><strong>Erythromycin</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child</strong></td>
<td>10 – 12.5 mg/kg/dose, four times daily, for seven days</td>
</tr>
<tr>
<td><strong>N.B.</strong></td>
<td>Can be first-line in school-aged children where the likelihood of atypical pathogens is higher.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Roxithromycin</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child &lt; 40 kg</strong></td>
</tr>
<tr>
<td><strong>Child &gt; 40 kg</strong></td>
</tr>
</tbody>
</table>

* Roxithromycin is now also available in a 50 mg dispersible tablet for children < 12 years.
**Ear, nose and throat**

**Otitis externa – acute**

<table>
<thead>
<tr>
<th>Management</th>
<th>Antibiotic treatment (topical) should only be considered if secondary infection is present. First-line management is gentle cleansing of the external ear canal, e.g. with suction, a wick or probe. If signs of infection persist after thorough cleansing, a solution containing an anti-infective and a corticosteroid may be considered. Underlying chronic otitis media should be excluded before treatment. Most topical antibacterials are contraindicated in the presence of a perforated drum or grommets; they may, however, be used with caution if cleansing of the ear canal alone has been unsuccessful in resolving symptoms. Patients with acute infection should be advised to avoid immersing their ears while swimming or to wear a protective cap. N.B. People with diabetes or who are immunocompromised are at risk of necrotizing or malignant otitis externa.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Common pathogens</th>
<th><em>Staphylococcus aureus, Streptococcus pyogenes, Pseudomonas aeruginosa, polymicrobial infections</em></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Antibiotic treatment</th>
<th>Otitis externa with secondary infection</th>
</tr>
</thead>
</table>
| **First choice** | **Flumethasone + clioquinol** (Locorten Vioform)  
**Adult and child > 2 years**: 2 to 3 drops, twice daily, for seven days  
**OR**  
**Dexamethasone + framycetin + gramicidin** (Sofradex)  
**Adult and child**: 2 to 3 drops, three to four times daily, for seven days |
| N.B. Avoid using drops for longer than one week as this may result in fungal infection which can be difficult to treat |

| Alternatives | **Acetic acid 2%** (Vosol) may be sufficient in mild cases.  
**Triamcinolone + neomycin + gramicidin + nystatin** (Kenacomb) if fungal infection is suspected  
**Ciprofloxacin + hydrocortisone** (Ciproxin HC) if *Pseudomonas* suspected.  
**Framycetin** (Soframycin) if a steroid is not required as part of the preparation. |
|---|---|

---

8
**Otitis media – acute**  Updated Apr, 2023

**Management**  Antibiotic treatment is usually unnecessary as most infections are self-limiting.

Consider antibiotics for children at high risk, e.g. with systemic symptoms, aged < 6 months, aged < 2 years with severe or bilateral infection, with perforation and/or otorrhoea or if there has been no improvement within 48 hours. Also consider antibiotics in children with recurrent infections, i.e. three or more episodes of otitis media within six months or four or more episodes within 12 months.

Otherwise treat symptomatically, e.g. paracetamol, and arrange follow up or give a “back pocket” antibiotic prescription to be dispensed if no improvement in next 48 hours.

**Otitis media with effusion** – antibiotics provide little or no long-term benefit in children without acute symptoms; watchful waiting is recommended. Consider referral to otorhinolaryngology (ENT if there is recurrent acute otitis media or if bilateral middle ear effusions persist for longer than three months.

For further information, see: Otitis media: a common childhood illness

**Common pathogens**  Respiratory viruses, *Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis*

**Antibiotic treatment**  Otitis media in child with risk factors or recurrent infection

| First choice | *Amoxicillin*  
| Child: 15 mg/kg/dose (maximum 1 g/dose), three times daily, for five days  
| For severe or persistent infection use 30 mg/kg/dose (maximum 1 g/dose in children aged over one month), three times daily, for seven days*  
| *Amoxicillin + clavulanic acid* can be considered if infection has not responded to high dose amoxicillin |
| Alternatives | *Erythromycin*  
| Child: 10 – 12.5 mg/kg/dose, four times daily, for five to seven days (maximum 1.6 g/day; maximum of 4 g/day in severe infections)  
| OR  
| *Trimethoprim + sulfamethoxazole*  
| Child > 6 weeks: 24 mg/kg/dose (maximum 960 mg/dose), twice daily, for five to seven days |
### Chronic suppurative otitis media

**Management**

Topical antibiotic treatment is recommended in all patients with chronic suppurative otitis media (CSOM).

CSOM is chronic inflammation of the middle ear and mastoid cavity characterised by otorrhoea persisting for at least two to six weeks through a perforated tympanic membrane or grommet – and otitis externa has been excluded.

Treatment ideally involves aural microsuction, followed by topical ear drops (containing a combination of anti-infective and anti-inflammatory agents), however, this may be limited by cost and access and often treatment begins with ear drops.

If combination drops do not improve CSOM, consider swabbing to direct further treatment or referral to otorhinolaryngology (ENT).

For further information, see: [Otitis media: a common childhood illness](#)

### Common pathogens

Respiratory viruses, *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*

Other potential causes include *Staphylococcus aureus*, *Pseudomonas aeruginosa* and fungal infection

### Antibiotic treatment

#### Suspected or confirmed CSOM

**Treatment options**

When choosing an appropriate ear drop, consider which is the most appropriate for the likely type of infection, the most suitable formulation and what is funded and available:

- **Ciprofloxacin + hydrocortisone** (Ciproxin HC)*
  - **Child and adult**: 3 drops, twice daily, for five to seven days
  - Fluroquinolone ear drops are generally recommended first-line in many guidelines on the balance of benefit and safety, but these are not currently funded and resistance needs to be considered. Discuss the possibility of self-funding.
  - * Ciprofloxacin eye drops 0.3% (five drops administered into the ear, twice daily for nine days) are funded for the second-line treatment of CSOM (unapproved indication). These drops do not contain an anti-inflammatory component that is usually recommended to treat CSOM and so may be less effective than combination drops.

- **Dexamethasone + framycetin + gramicidin** (Sofradex)
  - **Child and adult**: 2 – 3 drops, three to four times daily, for five to seven days
  - In practice, Sofradex is often used first-line (unless there is suspicion of *Pseudomonas* or a framycetin/gramicidin-resistant organism) as it is a thin fluid, generally well-tolerated and currently partly funded

- **Flumethasone + clioquinol** (Locorten Vioform)
  - **Child > 2 years and adult**: 2 – 3 drops, twice daily, for five to seven days
  - This ear drop is most appropriate for fungal/yeast infections in addition to aural microsuction.

- **Triamcinolone + neomycin + gramicidin + nystatin** (Kenacomb)
  - **Child and adult**: 2 – 3 drops, two to four times daily, for five to seven days
  - Kenacomb is an alternative to Locorten-Vioform, although these drops can be difficult to instil (thick yellow liquid) and their appearance can confound whether an infection is settling or not.
  - N.B. Avoid using drops for longer than seven days as there is increasing risk of ototoxicity, and a secondary infection, e.g. fungal, can develop
## Sinusitis – acute

### Management
Antibiotic treatment is not required in the majority of cases. More than 90% of patients with sinusitis will not have a bacterial infection. Even in the small minority that do, symptoms are self-limiting and antibiotics only offer a marginal benefit. Antibiotics may be considered for patients with symptoms that persist for more than ten days, onset of severe symptoms or fever (>39°C) and purulent nasal discharge or facial pain lasting for at least three consecutive days, or onset of worsening symptoms after initial improvement.

### Common pathogens
Respiratory viruses, *Streptococcus pneumoniae, Haemophilus influenzae, Moraxella catarrhalis*, anaerobic bacteria

### Antibiotic treatment

<table>
<thead>
<tr>
<th>First choice</th>
<th>Amoxicillin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Child:</strong></td>
<td>25 – 30mg/kg/dose, three times daily, for seven days (maximum 500 mg/dose age three months to five years, 1000 mg/dose age &gt; 5 years)</td>
</tr>
<tr>
<td><strong>Adult:</strong></td>
<td>500 – 1000 mg, three times daily for seven days</td>
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</table>

<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Doxycycline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adult and child &gt; 12 years:</strong></td>
<td>200 mg on day one, followed by 100 mg, once daily, on days two to seven</td>
</tr>
<tr>
<td><strong>Amoxicillin clavulanate</strong> <em>(if symptoms persist despite a treatment course of amoxicillin)</em></td>
<td><strong>Child:</strong> 15 – 30 mg/kg/dose, three times daily, for seven days (maximum 625 mg/dose)</td>
</tr>
<tr>
<td><strong>Adult:</strong></td>
<td>625 mg, three times daily, for seven days</td>
</tr>
</tbody>
</table>

* Expressed as a combination of amoxicillin and clavulanic acid 4:1 ratio
## Management
Antibiotic treatment of a sore throat is recommended for patients at high risk of rheumatic fever with group A Streptococcus (GAS) infection. Antibiotic treatment is unnecessary in almost all other cases, as a sore throat (which includes pharyngitis and tonsillitis) is often viral in origin, and whether caused by a virus or by GAS, is usually self-limiting. Antibiotics may be considered if the patient is at risk of complications.

**People at high risk of rheumatic fever** are those who have:

- A personal, family or household history of rheumatic fever
- OR
- Two or more of the following criteria:
  - Māori or Pacific ethnicity
  - Aged 3–35 years
  - Living in crowded circumstances or in lower socioeconomic areas

People at high risk of rheumatic fever should have a throat swab taken when empiric antibiotic treatment is initiated (if follow-up is possible). Patients who test negative for GAS can discontinue antibiotic use.

Antibiotic treatment of a sore throat may be considered in patients if peritonsillar cellulitis or abscess (quinsy) develops, but it is usually appropriate to refer these patients to hospital. Patients who develop scarlet fever require antibiotic treatment.

Rheumatic fever is a Notifiable Disease.

N.B. We acknowledge that differing treatment advice exists for rheumatic fever prevention within New Zealand. These recommendations reflect current national guidelines, and this topic will be updated as required.

 REFER TO THE [NEW ZEALAND HEART FOUNDATION ALGORITHM](#) FOR THE MANAGEMENT OF PATIENTS WITH SORE THROAT FOR FURTHER GUIDANCE

## Common pathogens
Respiratory viruses, Group A streptococcus (*Streptococcus pyogenes*) and other streptococcus spp.

## Antibiotic treatment
**Suspected or confirmed GAS in patients at high risk for rheumatic fever**

### First choice
**Phenoxymethylpenicillin** (Penicillin V)
- **Child < 20 kg**: 250 mg, two or three times daily, for ten days
- **Child ≥ 20 kg and adult**: 500 mg, two or three times daily, for ten days
  - OR
  - **Amoxicillin**
    - **Child**: 50 mg/kg/dose (maximum 1 g/dose),* once daily, for ten days; or 25 mg/kg/dose (maximum 500 mg/dose), twice daily, for ten days
    - **Adult**: 1 g, once daily, for ten days; or 500 mg, twice daily, for ten days
  - * Children under 30 kg who cannot tolerate 1000 mg amoxicillin as a single daily dose can be prescribed 750 mg amoxicillin, once daily, for 10 days as GAS is highly susceptible to penicillin
  - OR
    - **Benzathine penicillin**
      - **Child < 30 kg**: 450 mg, single IM dose
      - **Child ≥ 30 kg and adult**: 900 mg, single IM dose
  - † Benzathine penicillin can be given with 0.25 mL low dose lignocaine 2%, to reduce pain associated with the injection

### Alternatives
**Erythromycin**
- **Child**: 40 mg/kg/day, in two to three divided doses, for ten days (maximum 1.6 g/day)
- **Adult**: 800 mg, twice daily, for ten days
  - OR
  - **Roxithromycin**
    - **Adult**: 300 mg, once daily, for ten days; or 150 mg, twice daily, for ten days
## Conjunctivitis

| Management                                                                 | Antibiotic treatment is only required for patients with severe symptoms indicative of bacterial infection. Conjunctivitis can be viral, bacterial or allergic. Bacterial conjunctivitis is usually associated with purulent discharge. Symptoms are self-limiting and the majority of people improve without treatment, in two to five days. Conjunctivitis due to adenovirus and enterovirus is also self limiting. Patients with suspected HSV conjunctivitis require evaluation by an ophthalmologist. In newborn infants, consider *Chlamydia trachomatis* or *Neisseria gonorrhoeae*, in which case, do not use topical treatment. Collect appropriate eye swabs and refer to a paediatrician or ophthalmologist. Patients with conjunctivitis can be advised to clean away secretions from the eyelids and eyelashes using cotton wool soaked in water. Advise hand washing after touching the eyes and avoid sharing pillows, facecloths and towels. Do not wear contact lenses. Artificial tear drops can be used to relieve discomfort. |
|                                                                           | **Common pathogens** Viruses including HSV, *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Staphylococcus aureus*. Less commonly: *Chlamydia trachomatis* or *Neisseria gonorrhoeae* |
| **Antibiotic treatment** | **Severe bacterial conjunctivitis** |
| **First choice** | **Chloramphenicol 0.5% eye drops**  
*Adult* and *child > 2 years*: 1 – 2 drops, every 2 – 6 hours’ until 48 hours after symptoms have cleared (or five days, whichever is shorter). *Chloramphenicol 1% eye ointment* may also be used at night in patients with severe infection or as an alternative to eye drops.  
* Frequency of administration can be reduced after two to three days |
| **Alternatives** | **Framycetin eye/ear drops** (Soframycin)  
*Adult* and *child*: 2 drops every 1 – 2 hours reducing to 2 – 3 drops, three times daily, until 48 hours after symptoms have cleared.  
**Fusidic acid eye gel 1%**  
*Adult* and *child*: 1 drop, twice daily until 48 hours after symptoms have cleared. |
Dental Infections

Dental abscess

**Management**

Antibiotic treatment is recommended for people with severe infection (e.g. with cellulitis), diffuse, tense swelling around the affected tooth or systemic symptoms.

Acute dental pain can be managed with paracetamol, ibuprofen or a combination of the two. Codeine may be added if the pain is uncontrolled. To prevent aggravation of symptoms, patients can be advised to eat cool, soft foods, to chew on the unaffected side of the mouth and to avoid flossing near the abscess.

Acute localised infections of the gums are generally treated by removing food particles and advising use of chlorhexidine mouthwash. Marked swelling can be managed by lancing and draining the abscess. Advise the patient to follow this with a warm, salty mouthwash, three times daily, for five days, to promote continued drainage as incisions will often heal causing the abscess to refill with pus. Antibiotics should be considered if the infection is severe. Antibiotics are rarely indicated for toothache without signs of abscess.

Patients who have been treated in primary care for dental abscess should be referred for dental treatment as it is likely that the abscess will reoccur; tooth extraction or root canal may be required. The local DHB or PHO can provide information on available funding and services if there are barriers to private dental care.

**Common pathogens**

Polymicrobial with various anaerobes including viridans streptococci, the *Streptococcus anginosus* group, *Prevotella* and *Fusobacterium* species

**Antibiotic treatment**

For severe infection e.g. cellulitis, systemic symptoms or diffuse, tense and painful swelling

### First choice

**Amoxicillin**

- **Adult:** 1 g stat, followed by 500 mg, three times daily, for three days
- **Child:** 15–30 mg/kg (maximum 1 g), three times daily, for three days
  
  * Assess after three days to determine if further antibiotic treatment is required.

**OR**

**Metronidazole**

- **Child > 12 years** and **Adult:** 400 mg, three times daily for five days
- **Child < 12 years:** 7.5 mg/kg/dose (maximum 400 mg), three times daily for five days

N.B. Amoxicillin and metronidazole can be prescribed in combination for patients with particularly severe infection

### Alternatives

**Erythromycin**

- **Adult:** 800 mg, twice daily, or 400 mg, four times daily, for five days
- **Child:** 20 mg/kg/dose, twice daily; or 10 mg/kg/dose, four times daily; for five days (maximum 1.6 g/day).
**Prophylaxis of infective endocarditis prior to invasive dental procedures**

**Management**
Antibiotic treatment is indicated for people at high risk of developing infective endocarditis who are undergoing dental procedures involving manipulation of either gingival tissue or tooth root region or perforation of the oral mucosa, or tonsillectomy/adenoidectomy.

People with any of the following are considered to be at high risk of developing infective endocarditis:
- A prosthetic heart valve, either biological or mechanical
- Rheumatic valvular heart disease
- Previous endocarditis
- Unrepaired cyanotic congenital heart disease or a repair procedure within the last six months
- Cardiac shunts or conduits for palliation

People at high-risk of endocarditis do NOT require prophylactic antibiotic if they are undergoing any of the following:
- Routine dental anaesthetic injections through non-infected tissue
- Dental x-rays
- Placement of removable prosthodontic or orthodontic appliances
- Adjustment of orthodontic appliances
- Placement of orthodontic brackets
- Losing deciduous teeth
- Treatment of bleeding caused by trauma to the lips or oral mucosa
- Pregnant women

People at high risk of developing infective endocarditis who are undergoing general anaesthesia will generally be managed in a secondary care setting.


**Common pathogens**
*Viridans streptococci*

**Antibiotic treatment**

<table>
<thead>
<tr>
<th>Prophylactic treatment</th>
<th>First choice</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amoxicillin</strong></td>
<td>Adult: 2 g, stat, oral, intravenous or intramuscular</td>
<td>Clarithromycin*(penicillin allergy or a penicillin or cephalosporin in the previous month)*</td>
</tr>
<tr>
<td>Child: 50 mg/kg (maximum 2 g), stat*, oral, intravenous or intramuscular</td>
<td>Adult: 500 mg, single oral dose</td>
<td></td>
</tr>
<tr>
<td>* Oral antibiotics should be taken one hour prior to the procedure; intramuscular injections should be given 30 minutes prior and intravenous injections can be given immediately before the procedure.</td>
<td>Child: 15 mg/kg (maximum 500 mg) single oral dose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Unapproved indication. Clarithromycin can have serious interactions with other medicines. See the NZF interactions checker: <a href="http://www.nzf.org.nz">www.nzf.org.nz</a></td>
<td></td>
</tr>
</tbody>
</table>
Management
Antibiotic treatment should be given to all patients with suspected meningitis or meningococcal septicaemia, while awaiting transport to hospital (if this does not delay transfer).

Immediately refer all people with suspected meningitis or meningococcal septicaemia to hospital. Record observations, including neurological assessment, at least every 15 minutes while awaiting transfer. The first stage of meningococcal disease is associated with non-specific influenza-like symptoms and signs. Specific signs and symptoms of bacterial meningitis include: photophobia, severe headache, neck stiffness and focal neurologic deficit. Meningococcal septicaemia may be indicated by features such as non-blanching rash, unusual or mottled skin colour and rapidly deteriorating condition. Most patients will not display specific signs within the first four to six hours of illness (up to eight hours for adolescents) and infants may not display typical signs at all.

Meningococcal disease is notifiable on suspicion.

Common pathogens
Neisseria meningitidis, Streptococcus pneumoniae. Viral: enteroviruses, Herpes simplex virus, Varicella zoster virus and other viruses.

Rare: Listeria monocytogenes, Haemophilus influenzae

Infants: Group B Streptococcus, L. monocytogenes, E.coli

Antibiotic treatment
Suspected meningitis or meningococcal septicaemia

First choice
Ceftriaxone
Child: 100 mg/kg (up to 2 g) IV (or IM)
Adult: 2 g IV (or IM)

N.B. patients allergic to penicillin who do not have a documented history of anaphylaxis to penicillin can be given ceftriaxone

Alternatives
Benzylpenicillin (penicillin G)
Child: 50 mg/kg (up to 2 g) IV (or IM)
Adult: 2.4 g IV (or IM)

N.B. The treatment dose of benzylpenicillin is higher than previously recommended. Almost any parenterally administered antibiotic in an appropriate dose will inhibit the growth of meningococci, so if ceftriaxone or benzylpenicillin are not available, give any other cephalosporin or penicillin antibiotic.
**Skin**

**Bites – human and animal**

<table>
<thead>
<tr>
<th>Management</th>
<th>Antibiotic treatment is recommended for all patients with infected bites or as prophylactic treatment, depending on the nature of the bite. Prophylactic antibiotic treatment is recommended for human, dog or cat bites, severe or deep bites, bites on the hand, foot, face, tendon or ligament, in immunocompromised people and people presenting with an untreated bite, more than eight hours later. Clean and debride the wound thoroughly and assess the need for tetanus immunisation. Refer to hospital if there is bone or joint involvement.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Common pathogens</th>
<th>Polymicrobial infection, <em>Pasteurella multocida</em>, <em>Capnocytophaga canimorsus</em> (cat and dog bites), <em>Eikenella corrodens</em> (fist injury), <em>Staphylococcus aureus</em>, streptococci and anaerobes</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Antibiotic treatment</th>
<th>Infected bite or prophylaxis if risk factors</th>
</tr>
</thead>
</table>

**First choice**

| Child: 15 – 30 mg/kg/dose (maximum 625 mg/dose), three times daily, for seven days | Amoxicillin clavulanate* |
| Adult: 625 mg, three times daily, for seven days | |

* Expressed as a combination of amoxicillin and clavulanic acid 4:1 ratio

**Alternatives**

| Child > 12 years and Adult: Metronidazole 400 mg, three times daily, plus doxycycline 200 mg on day one, followed by 100 mg, once daily, on days two to seven. |  |
| Child < 12 years: Metronidazole 7.5 mg/kg/dose (maximum 400 mg), three times daily plus trimethoprim + sulphamethoxazole* 24 mg/kg/dose, twice daily, for seven days (maximum 20 mL/dose). | |

* Formerly referred to as co-trimoxazole oral liquid 40+200 mg/5 mL; now expressed as the total dose of trimethoprim + sulfamethoxazole (ratio 1:5) – 240 mg/5 mL oral liquid. N.B. avoid in infants aged under six weeks, due to the risk of hyperbilirubinaemia.
### Boils (furuncles)

**Management**
Antibiotic treatment is not usually required. Most lesions should be treated with incision and drainage alone. A topical antiseptic may be useful.

Antibiotics may be considered if there is fever, spreading cellulitis or co-morbidity, e.g. diabetes, or if the lesion is in a site associated with complications, e.g. the face.

**Common pathogens**
*Staphylococcus aureus*
Consider MRSA if there is a lack of response to flucloxacillin, another penicillin or cephalosporin.

<table>
<thead>
<tr>
<th>Antibiotic treatment</th>
<th>Boils (with complications)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First choice</strong></td>
<td><strong>Flucloxacillin</strong></td>
</tr>
<tr>
<td>Child: 12.5 – 25 mg/kg/dose, three to four times daily, for five days</td>
<td></td>
</tr>
<tr>
<td>Adult: 500 mg, four times daily, for five days</td>
<td></td>
</tr>
<tr>
<td><strong>Alternatives</strong></td>
<td></td>
</tr>
<tr>
<td>Erythromycin (if allergy to flucloxacillin or MRSA present*)</td>
<td></td>
</tr>
<tr>
<td>Child aged &lt; 12 years: 20 mg/kg/dose, twice daily, or 10 mg/kg/ dose, four times daily, for five days (maximum 1 g/day)</td>
<td></td>
</tr>
<tr>
<td>Adult: 800 mg, twice daily, or 400 mg, four times daily, for five days</td>
<td></td>
</tr>
<tr>
<td>Trimethoprim + sulfamethoxazole† (if allergy to flucloxacillin or MRSA present*)</td>
<td></td>
</tr>
<tr>
<td>Child &gt; 6 weeks: 24 mg/kg/dose, twice daily, for five to seven days (maximum 960 mg/dose)</td>
<td></td>
</tr>
<tr>
<td>Child &gt;12 years and Adult: 960 mg (two tablets), twice daily, for five to seven days</td>
<td></td>
</tr>
<tr>
<td>Cefalexin (if flucloxacillin not tolerated)</td>
<td></td>
</tr>
<tr>
<td>Child: 12.5 – 25 mg/kg/dose, twice daily, for five days</td>
<td></td>
</tr>
<tr>
<td>Adult: 500 mg, four times daily, for five days</td>
<td></td>
</tr>
</tbody>
</table>

* Based on MRSA susceptibilities

† Formerly referred to as co-trimoxazole oral liquid 40+200 mg/5 mL or co-trimoxazole tablets 80 + 400 mg; now expressed as the total dose of trimethoprim + sulfamethoxazole (ratio 1:5) – 240 mg/5 mL oral liquid or 480 mg tablets. N.B. avoid in infants aged under six weeks, due to the risk of hyperbilirubinaemia.
## Cellulitis

### Management
Antibiotic treatment is required for all patients with cellulitis. Oral antibiotic treatment is appropriate for those with mild to moderate cellulitis; intravenous treatment is usually required for patients with severe cellulitis or those not responding to oral treatment.

Keep affected area elevated (if applicable) for comfort and to relieve oedema. Assess response to treatment in two days. Discuss referral to hospital for consideration of IV antibiotics if cellulitis is extensive, not responding to oral antibiotics, systemic symptoms are present (e.g. fever, nausea, vomiting) and in young infants.

For **peri orbital or facial cellulitis**, in all but very mild cases refer to hospital for consideration of IV antibiotics.

### Common pathogens
*Streptococcus pyogenes*, *Staphylococcus aureus*, Group C or Group G streptococci

### Antibiotic treatment
**Mild to moderate cellulitis**

<table>
<thead>
<tr>
<th>First choice</th>
<th>Erythromycin (if allergy to flucloxacillin or MRSA present’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child &lt; 12 years</td>
<td>20 mg/kg/dose, twice daily, or 10 mg/kg/dose, four times daily, for five days (maximum 1 g/day)</td>
</tr>
<tr>
<td>Adult</td>
<td>800 mg, twice daily, or 400 mg, four times daily, for five days.</td>
</tr>
</tbody>
</table>

Trimethoprim + sulfamethoxazole† (if allergy to flucloxacillin or MRSA present’)

Child > 6 weeks: 24 mg/kg/dose, twice daily, for five to seven days (maximum 960 mg/dose)

Child >12 years and Adult: 960 mg (two tablets), twice daily, for five to seven days

Cefalexin (if flucloxacillin not tolerated)

Child: 12.5 mg/kg/dose, four times daily, for five days (maximum 500 mg/dose)

Adult: 500 mg, four times daily, for five days

* Based on MRSA susceptibilities

† Formerly referred to as co-trimoxazole oral liquid 40+200 mg/5 mL or co-trimoxazole tablets 80 + 400 mg; now expressed as the total dose of trimethoprim + sulfamethoxazole (ratio 1:5) – 240 mg/5 mL oral liquid or 480 mg tablets. N.B. avoid in infants aged under six weeks, due to the risk of hyperbilirubinaemia.
## Diabetic foot infections

### Management
Antibiotic treatment is required if there are signs of infection in the wound. It is recommended to take a wound swab for microbiological analysis.

The threshold for suspecting infection and testing a wound should be lower in people with diabetes and other conditions where perfusion and immune response are diminished, as classical clinical signs of infection are not always present.

Referral for further assessment should be considered if infection is suspected to involve the bones of the feet, if there is no sign of healing after four weeks of treatment, or if other complications develop.

Antibiotic treatment is not recommended for prevention of diabetic foot infections.

### Common pathogens
Early infection is usually due to *Staphylococcus aureus* and/or streptococci. Later infection may be polymicrobial with a mixture of Gram-positive cocci, Gram-negative bacilli and anaerobes.

### Antibiotic treatment
#### Infected foot wound in adult with diabetes

| First choice                     | Cefalexin 500 mg, four times daily, **plus metronidazole** 400 mg, two to three times daily, for five to seven days
|                                | **OR** (for patients with penicillin hypersensitivity)  
|                                | **Trimethoprim + sulfamethoxazole** 960 mg (two tablets), twice daily, **plus clindamycin** 300 mg, three times daily, for five to seven days |
|                                | * Formerly referred to as co-trimoxazole tablets 80 + 400 mg; now expressed as the total dose of trimethoprim + sulfamethoxazole (ratio 1:5) – 480 mg tablets. 
|                                | † Requires specialist endorsement for > 4 capsules |

* Expressed as a combination of amoxicillin and clavulanic acid 4:1 ratio
### Impetigo

**Management**  
Antibiotic treatment is not usually required initially; good skin hygiene is the first-line management. There is a limited role for topical antibiotic treatment; only for localised infection and second-line to topical antiseptics. Oral antibiotic treatment is recommended for more extensive, widespread infection, bullous impetigo or if systemic symptoms are present.

Initial management involves the simple measures of “clean, cut (nails) and cover”. Use moist soaks to gently remove crusts from lesions, keep affected areas covered and exclude the child from school or preschool until 24 hours after treatment has been initiated. Assess and treat other infected household members.

Topical treatment is only appropriate for areas of localised impetigo (usually ≤ 3 lesions). Current expert opinion favours the use of antiseptic cream, such as hydrogen peroxide or povidone-iodine, as first choice topical treatment, due to high rates of fusidic acid resistance in *S. aureus* in New Zealand.

Recurrent impetigo may be the result of chronic nasal carriage of *S. aureus* (patient or household contact), or re-infection from fomite colonisation, e.g. clothing, linen, and may require decolonization.

**Common pathogens**  
Streptococcus pyogenes, Staphylococcus aureus

**Antibiotic treatment**  
**Impetigo (non-antibiotic + antibiotic treatment)**

| First choice | Topical (localised area of infection):  
|--------------|---------------------------------------------------------------------|
| **Hydrogen peroxide 1% cream** | Apply 2 – 3 times daily, for five days  
| **Povidone-iodine 10% ointment** | Apply 2 – 3 times daily, for five days  
| **Oral** (extensive/multiple lesions) – treat as per cellulitis:  
| **Flucloxacillin** |  
| **Child:** 12.5 – 25 mg/kg/dose, four times daily, for five days (maximum 500 mg/dose)  
| **Adult:** 500 mg, four times daily, for five days |

| Alternatives | Topical  
|--------------|---------------------------------------------------|
| **Fusidic acid 2% cream or ointment** | Apply twice daily, for five days  
| N.B. Use topical Fusidic acid as second line treatment after topical antiseptics and only if the infection is localized.  
| If topical treatment fails, use oral treatment as above. |

| Oral | **Trimethoprim + sulfamethoxazole**  
|------|---------------------------------------------------------------------------------|
| **Child > 6 weeks:** 24 mg/kg/dose, twice daily, for five days (maximum 20 mL/dose)  
| **Child >12 years and Adult:** 960 mg (two tablets), twice daily, for five days  
| **Erythromycin** (if allergy to flucloxacillin or MRSA present†)  
| **Child aged < 12 years:** 20 mg/kg/dose, twice daily, or 10 mg/kg/ dose, four times daily, for five days (maximum 1.6 g/day)  
| **Adult:** 800 mg, twice daily, or 400 mg, four times daily, for five days  
| **Cefalexin** (if flucloxacillin not tolerated)  
| **Child:** 12 – 25 mg/kg/dose, twice daily, for five days  
| **Adult:** 500 mg, four times daily or 1 g, twice daily, for five days |

* Formerly referred to as co-trimoxazole oral liquid 40+200 mg/5 mL or co-trimoxazole tablets 80+400 mg; now expressed as the total dose of trimethoprim + sulfamethoxazole (ratio 1:5) – 240 mg/5 mL oral liquid or 480 mg tablets. N.B. avoid in infants aged under six weeks, due to the risk of hyperbilirubinaemia.

† Based on MRSA susceptibilities
### Mastitis

<table>
<thead>
<tr>
<th>Management</th>
<th>Antibiotic treatment is required for severe, worsening or persistent symptoms. Conservative management to alleviate symptoms (e.g. gentle massage, warm compress) and ongoing breast emptying may be all that is required for treatment. If there is no improvement within 12 – 24 hours or symptoms are severe or worsening, antibiotics should be started. Breast feeding (or expressing) from both breasts should be continued; this is an important component of treatment and poses no risk to the infant.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common pathogens</td>
<td><em>Staphylococcus aureus</em> in lactating women, <em>S. aureus</em> and anaerobes in non-lactating females, or in males</td>
</tr>
<tr>
<td>Antibiotic treatment</td>
<td><strong>Severe or non-resolving mastitis</strong></td>
</tr>
</tbody>
</table>
| **First choice** | **Flucloxacillin**  
*Adult:* 500 mg, four times daily, for 5 – 7 days |
| **Alternatives** | **Erythromycin**  
*Adult:* 400 mg, four times daily, for 5 – 7 days  
**Cephalexin**  
*Adult:* 500 mg, four times daily, for 5 – 7 days |
| N.B. | Treat mastitis in males or non-lactating females with amoxicillin clavulanate* 625 mg, three times daily, for seven days  
* Expressed as a combination of amoxicillin and clavulanic acid 4:1 ratio |
### Gastrointestinal

#### Campylobacter enterocolitis

**Management**

Antibiotic treatment is recommended for people with symptoms that are severe (e.g. high fever, bloody diarrhoea) or prolonged (> 7 days).

Antibiotics may also be considered for people at high risk of complications or those who are at higher risk of transmitting infection to vulnerable people (although this is rare). This includes pregnant women, people who are immunocompromised and their carers, food handlers and childcare workers.

Most people will recover with symptomatic treatment only, including rehydration. Antibiotics reduce the average duration of symptoms by less than two days but eradicate stool carriage. People can remain infectious to others for up to several weeks after onset of symptoms. However, with or without antibiotic treatment, spread from person to person is very rare.

Campylobacter enterocolitis is a notifiable disease.

<table>
<thead>
<tr>
<th>Common pathogens</th>
<th>Campylobacter jejuni</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antibiotic treatment</strong></td>
<td>Severe or prolonged campylobacter enterocolitis or high risk</td>
</tr>
<tr>
<td><strong>First choice</strong></td>
<td>Erythromycin</td>
</tr>
<tr>
<td>Child: 10 mg/kg/dose, four times daily, for five days</td>
<td>Adult: 400 mg, four times daily, for five days</td>
</tr>
<tr>
<td><strong>Alternatives</strong></td>
<td>Ciprofloxacin</td>
</tr>
<tr>
<td>Adult: 500 mg, twice daily, for five days (not recommended for children)</td>
<td></td>
</tr>
</tbody>
</table>

#### Clostridium difficile colitis

**Management**

Antibiotic treatment is recommended for adults who have tested positive for *C. difficile* toxin, and have diarrhoea or other symptoms consistent with colitis.

*C. difficile* colitis occurs due to overgrowth of toxin-producing *C. difficile* in the colon. A common cause is the use of broad spectrum antibiotic treatment. Discontinuing such antibiotic treatment, if and when possible, may lead to clinical resolution of symptoms.

Antidiarrhoeals, e.g. loperamide, should be avoided as the toxin may be retained and worsen colitis. Consider referral to hospital if there is evidence of worsening colitis. Relapse may occur after treatment.

In children, detection of *C. difficile* commonly represents colonisation rather than pathological infection, so testing is discouraged, and antibiotic treatment is not generally required in the community setting.

<table>
<thead>
<tr>
<th>Common pathogens</th>
<th>Clostridium difficile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antibiotic treatment</strong></td>
<td>Confirmed <em>C. difficile</em> (adults)</td>
</tr>
<tr>
<td><strong>First choice</strong></td>
<td>Metronidazole</td>
</tr>
<tr>
<td>Adult: 400 mg, three times daily, for 10 days</td>
<td></td>
</tr>
<tr>
<td><strong>Alternatives</strong></td>
<td>Vancomycin</td>
</tr>
<tr>
<td>If patient has not responded to two courses of metronidazole; discuss with an infectious diseases physician or clinical microbiologist. Oral vancomycin (using the injection product) may be required.</td>
<td></td>
</tr>
</tbody>
</table>
### Management

Antibiotic treatment is no longer routinely recommended for most patients with acute uncomplicated diverticulitis but may be considered for some patients who are at higher risk of complications (e.g. due to co-morbidities, systemically unwell), but who do not currently meet criteria for secondary care referral.

Antibiotic treatment is not necessary for patients with less severe symptoms and conservative treatment initiated in the community is more appropriate. Advise patients to maintain their normal diet, if tolerated. Some patients may prefer a clear liquid diet for two to three days to ease symptoms. Paracetamol can be prescribed for analgesia; NSAIDs or weak opioids can be considered if there are no contraindications.

Patients should be ideally followed up in 48 hours, or earlier depending on their clinical condition. Consider initiating antibiotic treatment at follow-up assessment 48 hours after initial presentation for patients with worsening or persistent symptoms.

Hospital referral is recommended for:

- Patients with symptoms suggestive of complicated diverticulitis or systemic infection, e.g. peritonitis or sepsis
- Immunocompromised patients
- Patients with significant or uncontrolled co-morbidities, e.g. diabetes, end-stage liver or renal disease or other risk factors, e.g. pregnancy, older age or frailty
- Patients who have difficulty controlling pain or tolerating oral liquids
- Patients with no support at home (or who are unable to independently seek medical attention if symptoms do not improve)

For further information, see: Diverticulitis: pockets of knowledge

### Common pathogens

*Bacteroides fragilis, Escherichia coli, Clostridium and Fusobacterium spp.*

N.B. Uncomplicated diverticulitis may primarily have an inflammatory cause

### Antibiotic treatment

**Uncomplicated diverticulitis in patients with higher risk of complications or who do not show improvement with 48 hours of conservative management in the community**

**First choice**

- **Metronidazole**
  - Adult: 400 mg, three times daily, for five or seven days
  
  PLUS EITHER:
  
  - **Trimethoprim + sulfamethoxazole**
    - Adult: 960 mg, twice daily, for five days
  
  OR
  
  - **Amoxicillin**
    - Adult: 500 mg, three times daily, for seven days
  
  OR
  
  - **Cefalexin**
    - Adult: 500 mg, two to three times daily (maximum 1 – 1.5 g, three to four times daily), for five days

* Give seven days course of metronidazole if prescribed with amoxicillin

**Alternatives**

- **Amoxicillin + clavulanic acid**
  - Adult: 625 mg, three times daily, for five days
**Management**  
Antibiotic treatment is recommended for people who have tested positive for giardia, and for symptomatic contacts.

Secondary lactose intolerance often occurs after giardiasis; patients with ongoing symptoms after treatment can consider temporarily avoiding lactose-containing foods (e.g. for one month).

People can remain infectious to others for up to several months after onset of symptoms.

Giardiasis is a notifiable disease.

**Common pathogens**  
*Giardia duodenalis* (also known as *Giardia intestinalis* and *Giardia lamblia*)

**Antibiotic treatment**  
**Confirmed giardiasis or symptomatic contact**

**First choice**  
**Ornidazole**  
*Child* < 35 kg: 125 mg/3 kg/dose,* once daily, for one to two days  
*Adult* and *child* > 35 kg: 1.5 g, once daily, for one to two days  
* N.B. Dose is per 3 kg bodyweight; ornidazole is only available in tablet form, tablets may be crushed, child dosing equates to one quarter of a tablet per 3 kg.

**OR**

**Metronidazole**  
*Child*: 30 mg/kg/dose, once daily, for three days (maximum 2 g/dose)  
*Adult*: 2 g, once daily, for three days

**Alternatives**  
For treatment failure with ornidazole:  
Exclude re-infection from asymptomatic family contacts, e.g. children

**Metronidazole**  
*Child*: 10 mg/kg/dose, three times daily, for seven days, (maximum 400 mg/dose)  
*Adult*: 400 mg, three times daily, for seven days  
*N.B. Nitazoxanide* (hospital treatment) may be considered for recurrent treatment failures.
Management
Antibiotic treatment is recommended for people with dyspepsia-like symptoms, who have tested positive for *Helicobacter pylori* infection and have not responded to acid suppression with a proton pump inhibitor (initial management).

The decision to test for *H. pylori* (with faecal antigen testing) in symptomatic people depends on a risk assessment based on multiple factors, including the patient’s ethnicity, country of birth, regional infection risk and severity of symptoms (see resource below for more details). Routine testing of all symptomatic people or prescribing eradication treatment empirically is not recommended.

Following antibiotic treatment, confirmation of eradication is not usually required, but may be appropriate when considering second-line treatment in patients who have remained symptomatic following an initial triple treatment regimen, or to confirm treatment success in patients with peptic ulcer complications or other significant gastric conditions.

If first-line antibiotic treatment is unsuccessful, consider the risks and benefits of escalating treatment. A different regimen can be considered, if testing confirms that *H. pylori* is still present three months or more since initial treatment. Alternatively, referral for endoscopy may be considered.

For further information, see: *H. pylori: who to test and how to treat*

Common pathogens
*Helicobacter pylori*

Antibiotic treatment
Confirmed *H. pylori* infection

**First choice**
Triple treatment regimen:

- **Omeprazole**
  - Adult: 20 mg, twice daily, for 7 – 14 days
  - **PLUS**

- **Clarithromycin**
  - Adult: 500 mg, twice daily, for 7 – 14 days
  - **PLUS EITHER:**

- **Amoxicillin**
  - Adult: 1 g, twice daily, for 7 – 14 days
  - **OR**

- **Metronidazole**
  - Adult: 400 mg, twice daily, for 7 – 14 days

N.B. If previous exposure to any macrolide antibiotic, prescribe omeprazole + amoxicillin + metronidazole (dosing as above); or if previous exposure to metronidazole, prescribe omeprazole + amoxicillin + clarithromycin (dosing as above).

* Regimens using alternative PPIs are also available; refer to NZF for details

**Alternatives**
If testing confirms that *H. pylori* is still present three months or more since initial treatment and the benefit of further antibiotic treatment outweighs the risks

Quadruple treatment regimen:

- **Omeprazole**
  - Adult: 20 mg, twice daily, for 14 days
  - **PLUS**

- **Tripotassium dicitratobismuthate (bismuth) [Section 29, unapproved medicine]**
  - Adult: 120 mg, four times daily, for 14 days
  - **PLUS**

- **Tetracycline hydrochloride [Section 29, unapproved medicine]**
  - Adult: 500 mg, four times daily, for 14 days
  - **PLUS**

- **Metronidazole**
  - Adult: 400 mg, three times daily, for 14 days

* Funded with Special Authority approval
### Salmonella enterocolitis

**Management**
Antibiotic treatment is usually unnecessary and may prolong excretion. Antibiotic treatment is, however, recommended for adults with severe disease, those who are immunocompromised and those with prosthetic vascular grafts.

Discuss appropriate treatment for infants with a paediatrician; those aged < 3 months will require investigation and antibiotic management; those aged > 3 – 12 months may not, depending on clinical state.

People typically remain infectious to others for several days to weeks after onset of symptoms; children may remain infectious for up to one year. However, with or without antibiotic treatment, spread to others is very rare.

**Common pathogens**
*Salmonella enteritidis, Salmonella typhimurium*

**Antibiotic treatment**
*Severe salmonella enterocolitis or risk factors*

<table>
<thead>
<tr>
<th>First choice</th>
<th>Ciprofloxacin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Adult:</strong></td>
<td>500 mg, twice daily, for three days</td>
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<table>
<thead>
<tr>
<th>Alternatives</th>
<th>Trimethoprim + sulfamethoxazole*</th>
</tr>
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<tbody>
<tr>
<td><strong>Adult:</strong></td>
<td>960 mg (two tablets), twice daily, for three days</td>
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</table>

* Formerly referred to as co-trimoxazole tablets 80 + 400 mg; now expressed as the total dose of trimethoprim + sulfamethoxazole (ratio 1:5) – 480 mg tablets.
## Genito-urinary

### Chlamydia  Updated Apr, 2023

#### Management

Antibiotic treatment is indicated for patients with confirmed chlamydia and their sexual contacts within the last three months or if there is a high suspicion of chlamydia (based on symptoms and/or signs).

Complicated genital infections and symptomatic anorectal infections should be discussed with a sexual health physician.

In suspected cases, empiric treatment should be commenced while awaiting laboratory results.

Advise patients to avoid unprotected sexual intercourse for seven days after treatment initiation, and for at least seven days after any sexual contacts have been treated, to avoid re-infection.

A test of cure should be done five weeks after initiation of treatment in pregnant females, if a non-standard treatment has been used, e.g. amoxicillin, if symptoms do not resolve or if the patient had extragenital symptoms (e.g. rectal or oral).

Repeat STI testing in three months.

For the Aotearoa New Zealand STI Guidelines for use in primary care, see: [https://sti.guidelines.org.nz/infections/chlamydia/](https://sti.guidelines.org.nz/infections/chlamydia/)

#### Common pathogens

*Chlamydia trachomatis*

#### Antibiotic treatment

<table>
<thead>
<tr>
<th>First choice</th>
<th>Confirmed or suspected chlamydia</th>
</tr>
</thead>
</table>
| **Doxycycline** (if uncomplicated genital or oral infection or asymptomatic anorectal infection) | **Adult:** 100 mg, twice daily, for seven days*  
| N.B. Do not use in pregnancy; use only in breastfeeding if there are no suitable alternatives. |   |
| * For symptomatic anorectal infections see: [Proctitis – STI cause](https://sti.guidelines.org.nz/infections/chlamydia/) |   |
| If co-infection with gonorrhoea is suspected: |   |
| **Doxycycline** 100 mg, twice daily, for seven days **PLUS Ceftriaxone** 1 g, single IM dose, (funded by endorsement on PSO or prescription, make up with 3.5 mL of 1% lignocaine) |   |
| **Alternatives** | **Adult:** 1 g, single oral dose†  
| **Azithromycin** (if adherence is a concern) |   |
| † If anorectal infection, give *azithromycin* 1 g, as a stat oral dose on day one and repeat on day eight |   |
| **OR** |   |
| **Amoxicillin** (can be used as an alternative to doxycycline for pregnant females or if azithromycin is contraindicated) |   |
| **Adult:** 500 mg, three times daily, for seven days |   |
**Management**  
Antibiotic treatment is required for all patients with suspected epididymo-orchitis and their sexual contacts within the last three months (if appropriate).

A range of infections can cause epididymo-orchitis. STI pathogens are the most likely cause in males aged < 35 years, with more than one sexual partner in the past 12 months and with urethral discharge. Urinary or enteric pathogens account for other cases, usually in older males. Test for chlamydia, gonorrhoea and urinary tract infections as indicated by history; empirical treatment should be given while awaiting results.

If symptoms are initially severe or symptoms and signs do not resolve (or worsen) after 24 to 72 hours, refer to hospital.

Advise patients to avoid unprotected sexual intercourse for two weeks after treatment initiation, and for at least seven days after any sexual contacts have been treated, to avoid re-infection.


**Common pathogens**  
Majority of cases in sexually active males are due to *Chlamydia trachomatis* or *Neisseria gonorrhoeae*

Also *Escherichia coli*, *Bacteroides* spp., *Gardnerella vaginalis*, *Mycoplasma hominis*, *Ureaplasma urealyticum*, *Trichomonas vaginalis*, *Streptococcus agalactiae* and others

**Antibiotic treatment**  
**Suspected epididymo-orchitis**

**First choice**

If STI pathogens suspected:

**Ceftriaxone**  
**Adult:** 500 mg, single IM dose (funded by endorsement on PSO or prescription, make up with 2 mL of lignocaine 1%)

**PLUS**

**Doxycycline**  
**Adult:** 100 mg, twice daily, for 14 days

If UTI pathogens suspected:

**Amoxicillin + clavulanic acid**  
**Adult:** 625 mg, three times daily, for ten days

If required, treatment should be modified according to MSU results

**Alternatives**

If UTI pathogens suspected:

**Trimethoprim + sulfamethoxazole**  
**Adult:** 960 mg, twice daily, for ten days

**OR**

**Ciprofloxacin**  
**Adult:** 500 mg, twice daily, for ten days
**Gonorrhoea** Updated Apr, 2023

**Management**

Antibiotic treatment is indicated for people with confirmed gonorrhoea and their sexual contacts within the last three months or if there is a high suspicion of gonorrhoea (based on symptoms and/or signs).

In suspected cases, empiric treatment should be commenced while awaiting laboratory results.

Advise patients to avoid unprotected sexual intercourse for seven days after treatment initiation, and for at least seven days after any sexual contacts have been treated, to avoid re-infection.

A test of cure should be done five weeks after initiation of treatment in pregnant females, or if a non-standard treatment has been used or if symptoms do not resolve.

Repeat STI testing in three months.

For the Aotearoa New Zealand STI Guidelines for use in primary care, see: [https://sti.guidelines.org.nz/infections/gonorrhoea/](https://sti.guidelines.org.nz/infections/gonorrhoea/)

**Common pathogens**

*Neisseria gonorrhoeae*

**Antibiotic treatment**

**Confirmed or suspected gonorrhoea**

**First choice**

*Ceftriaxone*

**Adult:** 500 mg, single IM dose (funded by endorsement on PSO or prescription, make up with 2 mL of 1%)

**PLUS:**

*Azithromycin*

**Adult:** 1 g, single oral dose (including in females who are pregnant or breastfeeding)

*If co-infection with chlamydia is suspected:*

*Ceftriaxone*

**Adult:** 1 g, single IM dose (funded by endorsement on PSO or prescription, make up with 3.5 mL of 1% lignocaine)

**PLUS:**

*Doxycycline*

**Adult:** 100 mg, twice daily, for seven days*

* For symptomatic anorectal infections see: [Proctitis – STI cause](https://sti.guidelines.org.nz/infections/gonorrhoea/)

**Alternatives**

Strongly recommended to discuss with a sexual health physician, however, if isolate is proven to be ciprofloxacin susceptible and an alternative is required:

*Ciprofloxacin* 500 mg, single oral dose + *Azithromycin* 1 g, single oral dose
**Management**

Antibiotic treatment is recommended for confirmed *Mycoplasma genitalium* infection following discussion with a sexual health physician or clinical microbiologist.

*M. genitalium* often co-exists with other bacterial STIs such as chlamydia or trichomoniasis.

Most people are asymptomatic and do not develop complications; spontaneous resolution of *M. genitalium* is possible. Routine testing is not recommended, however, it may be required for patients who present with persistent or recurrent penile urethritis who have not responded to standard empiric antibiotic treatment and sexual contacts of positive cases.

Patients with confirmed infection or sexual contacts of confirmed cases should be discussed with a sexual health physician or clinical microbiologist before initiating treatment, due to high rates of resistance.

The treatment regimen recommended for patients with confirmed *M. genitalium* infection depends on the presenting condition, whether the infection is macrolide susceptible and any previous antibiotic treatments that have been given for the infection.

A test of cure should be done five weeks after initiation of treatment in all patients with confirmed *M. genitalium* infection.

For further information, see: *Mycoplasma genitalium: considerations for testing and treatment in primary care*

For the Aotearoa New Zealand STI Guidelines for use in primary care, see: https://sti.guidelines.org.nz/infections/mycoplasma-genitalium/

**Common pathogens**

*Mycoplasma genitalium*

**Antibiotic treatment**

**Confirmed *M. genitalium* infection following discussion with a sexual health physician or clinical microbiologist**

**First choice**

**INITIAL TREATMENT (to reduce bacterial load):**

**Doxycycline** (as a pre-treatment to reduce bacterial load in symptomatic patients)

**Adult:** 100 mg, twice daily, for seven days

**FOLLOWED BY EITHER:**

**Azithromycin** (if macrolide susceptible)

**Adult:** 1 g, single oral dose, on day one, followed by 500 mg, once daily, on days two to four (total 2.5 g)

**OR**

**Moxifloxacin*** (if macrolide resistant†, macrolide resistance unknown or treatment with azithromycin has failed)

**Adult:** 400 mg, once daily, for seven days

N.B. If *M. genitalium* infection has been confirmed and it has been less than two weeks since the patient completed a course of doxycycline, a repeat pre-treatment course of doxycycline is not necessary.

* Unapproved indication. Fully funded with Special Authority approval (application by or on recommendation of a sexual health physician).

† If susceptibility testing confirms macrolide resistant *M. genitalium* and the patient is pregnant or breastfeeding, discuss with a sexual health physician.
**Management**

Antibiotic treatment is required for females who are symptomatic.

Pelvic inflammatory disease (PID) is usually caused by a STI, particularly in females aged < 30 years, those who have had a recent change of sexual partner or those with a previous history of gonorrhoea or chlamydia.

Recommended investigations include:

- STI testing
- Urine pregnancy test
- Urinalysis

Treatment should be initiated for patients who present with lower abdominal pain and one or more of adnexal, cervical motion or uterine tenderness. Treatment should cover infection with gonorrhoea, chlamydia and anaerobes.

Patients should be followed up within 24 to 72 hours of starting treatment. Females with severe symptoms (e.g. fever, vomiting, acute abdominal pain), symptoms that are not improving within 72 hours and pregnant females require referral for specialist assessment. Hospital referral may be required for IV antibiotics.

Advise abstinence from sexual intercourse until abdominal pain has settled and avoidance of unprotected sexual intercourse for 14 days after treatment initiation, and for at least seven days after any sexual contacts have been treated, to avoid re-infection.


**Common pathogens**

*Chlamydia trachomatis*, *Neisseria gonorrhoeae*, mycoplasmas and mixed anaerobes

**Antibiotic treatment**

**Suspected pelvic inflammatory disease**

**First choice**

- **Ceftriaxone**
  - Adult: 500 mg, single IM dose, (funded by endorsement on PSO or prescription, make up with 2 mL of 1% lignocaine) or single IV dose (make up with 5 mL of sterile water and administer over a period of two to four minutes)
  - PLUS
- **Doxycycline**
  - Adult: 100 mg, twice daily, for 14 days
  - PLUS
- **Metronidazole**
  - Adult: 400 mg, twice daily, for 14 days (metronidazole may be discontinued if not tolerated)

**Alternatives**

If pregnant, breastfeeding or if adherence is likely to be poor:

- **Ceftriaxone**
  - Adult: 500 mg, single IM dose, (funded by endorsement on PSO or prescription, make up with 2 mL of 1% lignocaine) or single IV dose (make up with 5 mL of sterile water and administer over a period of two to four minutes)
  - PLUS
- **Azithromycin**
  - Adult: 1 g, single oral dose, on day one and 1 g, single oral dose on day eight
  - PLUS
- **Metronidazole**
  - Adult: 400 mg, twice daily, for 14 days

N.B. *Ornidazole* may be considered as an alternative if metronidazole is not tolerated.
### Management

Antibiotic treatment is recommended for patients with proctitis caused by a STI. Management can be complex, and it is recommended that patients with proctitis that could be caused by a STI are referred to a specialist sexual health clinic or discussed with a sexual health physician.

Investigations for patients with anorectal symptoms and a history of anal intercourse should include STI testing, and a rectal swab for chlamydia, syphilis, *Neisseria gonorrhoeae* and herpes simplex virus. If positive test for chlamydia, discuss with a sexual health physician or clinical microbiologist as they may recommend testing for *Lymphogranuloma venereum* (LGV). If the patient is experiencing diarrhoea, a faecal specimen should be collected to test for enteric pathogens, which can be transmitted sexually. Sexual contacts should receive STI testing.

If STI test results are negative, antibiotic treatment can be stopped. Further discussion with a sexual health physician is recommended for patients who remain symptomatic.

Advise patients to avoid unprotected sexual intercourse until treatment has been completed and symptoms have resolved.

Advice regarding a test of cure will depend on the specific pathogen. See relevant section of the guide.

Repeat STI testing in three months.

For the Aotearoa New Zealand STI Guidelines for use in primary care, see: [https://sti.guidelines.org.nz/syndromes/anorectal-syndromes/](https://sti.guidelines.org.nz/syndromes/anorectal-syndromes/)

### Common pathogens

Herpes simplex viruses (HSV Types 1 and 2), *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Treponema pallidum* (syphilis), *Mycoplasma genitalium*

### Antibiotic treatment

**Patients with proctitis with a suspected STI cause**

**First choice**

Treatment should be guided by a sexual health physician, as management may be complex, and further testing may be required.

A regimen for non-specific proctitis may be:

**Doxycycline**

- **Adult:** 100 mg, twice daily, for 21 days*

  **PLUS**

  **Ceftriaxone**

- **Adult:** 500 mg, single IM dose (funded by endorsement on PSO or prescription, make up with 2 mL of 1% lignocaine)

  **PLUS**

  **Valaciclovir**

- **Adult:** 500 mg, twice daily, for seven days

* Treatment duration is 21 days to cover possible *Lymphogranuloma venereum* proctitis
**Management**

Antibiotic treatment is recommended for all males with acute or chronic bacterial prostatitis. Patients with prostatitis often present with pelvic or genitourinary pain, e.g. perineal pain, rectal pain, pain during or after ejaculation, and lower urinary tract symptoms such as urgency, dysuria, hesitancy, incomplete bladder emptying.

Acute bacterial prostatitis can be diagnosed clinically by the rapid onset of severe urinary symptoms and patients are often systemically unwell, e.g. fever, rigors, vomiting.

Consider chronic bacterial prostatitis if symptoms (usually less severe) are present intermittently or continuously for at least three months, and other causes have been excluded, e.g. STIs and prostate cancer.

A mid-stream urine sample should be collected for susceptibility testing to guide antibiotic selection and to support the diagnosis. Appropriate antibiotics are those with good penetration into prostatic tissue.

N.B. Antibiotics are not recommended for the treatment of chronic prostatitis/chronic pelvic pain syndrome (CP/CPPS), i.e. prostatitis without a history of urinary tract infections or the identification of a potentially causative pathogen.

For further information, see: [Prostatitis: diagnosis and management in primary care](#)

**Common pathogens**

Gram-negative bacteria are the most common cause, e.g. *Escherichia coli*, *Klebsiella* spp., *Proteus* spp. and *Enterococcus* spp.

*Pseudomonas aeruginosa* (in patients with an indwelling catheter or have undergone a recent urological procedure)

**Antibiotic treatment**

### Bacterial prostatitis

#### First choice

**Trimethoprim**

**Adult**: 300 mg, once daily, for two to four weeks* if acute infection, or four to six weeks if chronic infection

**OR**

**Trimethoprim + sulfamethoxazole**

**Adult**: 960 mg, twice daily, for two to four weeks* if acute infection, or four to six weeks if chronic infection

* After 14 days treatment efficacy should be reviewed. Antibiotic treatment can be withdrawn if the symptoms have resolved, or an additional 14 days of treatment may be advised depending on the patient’s symptoms, signs and test results.

#### Alternatives

**Ciprofloxacin**

**Adult**: 500 mg, twice daily, for four weeks
**Management**

Antibiotic treatment is indicated for patients with confirmed trichomoniasis and their sexual partners or if there is a high suspicion of trichomoniasis (symptoms and/or signs). Co-infection with other STIs should be considered and co-existent bacterial vaginosis is common.

Empiric treatment may be commenced while awaiting laboratory results. Due to low sensitivity, culture of urethral swabs is rarely positive in males, even if infection is present.

Advise patients to avoid unprotected sexual intercourse for seven days after treatment initiation, and for at least seven days after any sexual contacts have been treated, to avoid re-infection.

A test of cure is not usually required unless there is a risk of re-exposure or symptoms persist.

Repeat STI testing in three months as re-infection is common.

For the Aotearoa New Zealand STI Guidelines for use in primary care, see: [https://sti.guidelines.org.nz/infections/trichomoniasis/](https://sti.guidelines.org.nz/infections/trichomoniasis/)

### Common pathogens

*Trichomonas vaginalis*

### Antibiotic treatment

#### Confirmed or suspected trichomoniasis

**First choice**

**Metronidazole**

*Adult:* 400 mg, twice daily, for seven days; or 2 g, single oral dose*

N.B. Manufacturers recommend to avoid metronidazole for trichomoniasis in the first trimester of pregnancy. Single dosing can be used in breastfeeding; milk should be discarded for 24 hours following dose.

* Single-dose treatment is associated with an increased risk of adverse effects and diminished efficacy but may be appropriate if adherence is an issue

**Alternatives**

**Ornidazole**

*Adult:* 500 mg, twice daily, for five days; or 1.5 g, single oral dose

N.B. Manufacturers of ornidazole advise to only use in pregnancy if potential benefit outweighs risk (animal studies suggest no adverse effects). There are no data in breastfeeding. STI guidelines recommend to avoid ornidazole in pregnancy.
Management
Antibiotic treatment is required for males who are symptomatic and their sexual contacts within the last three months.
Non-specific urethritis is a diagnosis of exclusion. A first void urine sample should be taken to exclude gonorrhoea and chlamydia (consider a urethral swab for herpes simplex virus if patient has metritis, inguinal lymphadenopathy or severe dysuria). Advise patients to avoid unprotected sexual intercourse for seven days after treatment initiation, and for at least seven days after any sexual contacts have been treated, to avoid re-infection.
In patients with symptoms persisting for more than two weeks, or with recurrence of symptoms, consider retesting or refer to a sexual health clinic or urologist.
A test of cure is not usually required unless patient remains symptomatic following treatment or *Mycoplasma genitalium* was the causal pathogen.
Repeat STI testing in three months.

Common pathogens
Urethritis not attributable to *Neisseria gonorrhoeae* or *Chlamydia trachomatis* is termed non-specific urethritis and there may be a number of pathogens responsible, e.g. *Mycoplasma genitalium* or *Trichomonas vaginalis*

Antibiotic treatment
Symptomatic acute non-specific urethritis

**First choice**
If discharge is minimal, or not visible:
*Doxycycline*
**Adult:** 100 mg, twice daily, for seven days  
**OR**  
If significant visible discharge or known contact with gonorrhoea:
*Ceftriaxone*
**Adult:** 500 mg, single IM dose (funded by endorsement on PSO or prescription, make up with 2 mL of 1% lignocaine)  
**PLUS**  
*Azithromycin*
**Adult:** 1 g, single oral dose  
**OR**  
If confirmed chlamydia or gonorrhoea infection:
*Ceftriaxone*
**Adult:** 1 g, single IM dose (funded by endorsement on PSO or prescription, make up with 3.5 mL of 1% lignocaine)  
**PLUS**  
*Doxycycline*
**Adult:** 100 mg, twice daily, for seven days

**Alternative**
If adherence to doxycycline is a concern or an alternative is required:
*Azithromycin*
**Adult:** 1 g, single oral dose
**Management**

Antibiotic treatment is indicated for adults with symptoms and signs of cystitis (lower urinary tract infection).

Urine culture is not necessary to diagnose cystitis. Urine culture is most useful for confirming the presence of significant bacteriuria and reporting on bacterial susceptibility to antibiotics in infections that are considered to be complicated due to an abnormality of the urinary tract or an underlying condition or clinical circumstance; this includes:

- Males
- Pregnant women
- People with diabetes or renal failure
- People with a urinary catheter
- People living in residential care facilities
- People with persistent or recurrent cystitis (three or more infections in one year) or atypical symptoms

N.B. Urine culture is not recommended in asymptomatic people. However, if bacteriuria is incidentally found to be present, this only requires antibiotic treatment in pregnant women. Also see pyelonephritis

**Common pathogens**

*Escherichia coli, Staphylococcus saprophyticus, Proteus spp., Klebsiella spp., Enterococcus spp.*

**Antibiotic treatment**

**Symptomatic cystitis (adult)**

**First choice**

**Nitrofurantoin**

**Adult:** 50 mg (immediate release, Nifuran), four times daily, or 100 mg (modified release, Macrobid), twice daily, for five days (avoid at 36+ weeks in pregnancy, and in patients with creatinine clearance < 60 mL/min).

N.B. Treat for seven days in pregnant women and in males

**Alternatives**

**Trimethoprim**

**Adult:** 300 mg, once daily, for three days (avoid during the first trimester of pregnancy)

N.B. Treat for seven days in pregnant women and in males

**Cefalexin** – only if infecting organism known to be susceptible, and resistant to the other choices

**Adult:** 500 mg, twice daily, for three days

N.B. Treat for seven days in pregnant women and in males

N.B. If susceptibility testing indicates resistance to commonly available antibiotics, discuss treatment with a clinical microbiologist or infectious diseases specialist; alternative antimicrobials may be available in some DHBs
Urinary tract infection – Cystitis: child

**Management**
Antibiotic treatment (oral) is indicated for children aged over six months, without known renal tract abnormalities, and who do not have acute pyelonephritis. Refer children aged under six months, those with severe illness, or those with recurrent infection, to hospital for treatment.

All children with suspected urinary tract infection should have a urine sample for culture collected (clean catch, catheter, midstream urine) as it may be a marker for previously undetected renal malformations, particularly in younger children. In older children it can be a marker for bladder and/or bowel dysfunction.

For information on collecting a urine specimen in children, see: “Managing urinary tract infections in children”, BPJ 44 (May, 2012).

**Common pathogens**
*Escherichia coli, Proteus spp., Klebsiella spp., Enterococcus spp.*

**Antibiotic treatment**
*Mild cystitis (child)*

**First choice**
Trimethoprim + sulfamethoxazole<sup>*</sup>
Child: 24 mg/kg/dose, twice daily, for three days (maximum 960 mg/dose)
* Formerly referred to as co-trimoxazole oral liquid 40+200 mg/5 mL; now expressed as the total dose of trimethoprim + sulfamethoxazole (ratio 1:5) – 240 mg/5 mL oral liquid. N.B. avoid in infants aged under six weeks, due to the risk of hyperbilirubinaemia.

**Alternatives**
Cefalexin
Child > 1 month: 12.5 – 25 mg/kg/dose, twice daily, for three days (maximum 1 g/dose)
Amoxicillin clavulanate<sup>*</sup>
Child: 15 mg/kg/dose, three times daily, for three days (maximum 625 mg/dose)
* Expressed as a combination of amoxicillin and clavulanic acid 4:1 ratio

Urinary Tract Infection – Pyelonephritis  Updated June, 2023

**Management**
Antibiotic treatment (oral) is required for all patients with mild symptoms of pyelonephritis (upper urinary tract infection); adult patients with more severe symptoms (e.g. vomiting, dehydration, high fever), may require hospital referral for treatment. However, if the patient meets eligibility criteria for treatment in the community and appropriate monitoring is available, give one dose of IV (or IM) ceftriaxone or IV gentamicin (refer to local protocols or NZF for dosing information), followed by standard oral treatment.

All infants and children require hospital referral for treatment. Pregnant females require immediate obstetric referral.

Urine culture is recommended for all patients with suspected pyelonephritis. Renal tract ultrasound may also be appropriate depending on the clinical situation.

**Common pathogens**
*Escherichia coli, Proteus spp., Klebsiella spp., Enterococcus spp.*

**Antibiotic treatment**
*Mild pyelonephritis (adult)*

**First choice**
Trimethoprim + sulfamethoxazole
Adult: 960 mg, twice daily, for ten days

**Alternatives**
Amoxicillin clavulanate
Adult: 625 mg, three times daily, for ten days
**OR**
Cefalexin – only if infecting organism known to be susceptible, and resistant to the other choices
Adult: 1 g, three to four times daily, for ten days
**Management**

Antibiotic treatment is recommended for females who are symptomatic, pregnant or if an invasive procedure is planned, e.g. insertion of an intrauterine contraceptive or surgical abortion.

Approximately half of females found to have bacterial vaginosis are asymptomatic; antibiotic treatment is not necessary in these cases if there are no other risk factors. Treatment of male sexual contacts is not usually necessary.


**Common pathogens**

Gardnerella vaginalis, Bacteroides spp., Peptostreptococcus spp. and Mobilunculus spp.

<table>
<thead>
<tr>
<th>Antibiotic treatment</th>
<th>Symptomatic bacterial vaginosis</th>
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<tbody>
<tr>
<td><strong>First choice</strong></td>
<td>Metronidazole</td>
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<tr>
<td></td>
<td><strong>Adult:</strong> 400 mg, twice daily, for seven days; or 2 g, single oral dose*</td>
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<td>N.B Manufacturers recommend to avoid metronidazole for bacterial vaginosis in the first trimester of pregnancy.</td>
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<td>* If adherence to treatment is a concern, however, this is associated with a higher relapse rate</td>
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<tr>
<td><strong>Alternatives</strong></td>
<td>Ornidazole</td>
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<tr>
<td></td>
<td><strong>Adult:</strong> 500 mg, twice daily, for five days</td>
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<td>N.B. Manufacturers of ornidazole advise to only use in pregnancy if potential benefit outweighs risk (animal studies suggest no adverse effects). STI guidelines recommend to avoid ornidazole in pregnancy. There are no data in breastfeeding.</td>
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<tr>
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<td><strong>OR</strong> Clindamycin</td>
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<td></td>
<td><strong>Adult:</strong> 300 mg, twice daily, for seven days</td>
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