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**NATIONAL INSTITUTE FOR HEALTH AND CARE
EXCELLENCE**

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4

Guideline

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**Otitis media (acute): antimicrobial
prescribing**

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Background

- Acute otitis media is a self-limiting infection of the middle ear mainly affecting children.
- It can be caused by viruses and bacteria, and both are often present at the same time.
- Symptoms last for about 3 days, but can last for up to 7 or 8 – most children get better within 3 days without antibiotics.
- Antibiotics do not improve pain at 24 hours, and at later time points the number of children improving with antibiotics is similar to the number with adverse effects, such as diarrhoea.
- Antibiotics make little difference to the rates of common complications, such as hearing loss (which is usually temporary), perforated eardrum and recurring infection.
- Complications such as mastoiditis are rare, and the number needed to treat with antibiotics to prevent 1 child from developing mastoiditis is 4831.
- Acute otitis media is uncommon in adults – the recommendations in this guideline are based on the evidence identified, which was for children and young people.

1 **Recommendations**

2 ***Managing acute otitis media***

3 **All children and young people presenting with symptoms or signs of** 4 **acute otitis media**

- 5 • Offer paracetamol or ibuprofen for pain (see the recommendations on [self-](#)
6 [care](#); assess and manage children aged under 5 who present with fever as
7 outlined in the NICE guideline on [fever in under 5s](#)).
 - 8 – Paracetamol or ibuprofen need to be taken at the right time and at the
9 right dose for the age or weight of the child, with maximum doses being
10 used for severe pain (see [BNF for children](#) for dosing information).

11 **All children and young people presenting with symptoms or signs of** 12 **acute otitis media except those of any age also with otorrhoea** 13 **(discharge following perforation of the ear drum) or children under** 14 **2 years with acute otitis media in both ears**

- 15 • Consider no antibiotic prescription or a [back-up antibiotic prescription](#) (see
16 the recommendations on [choice of antibiotic](#)), taking account of:
 - 17 – evidence that antibiotics make little difference to how long symptoms
18 (such as earache) last, or the proportion of children with improved
19 symptoms
 - 20 – evidence that antibiotics make little difference to the proportion of
21 children with recurrent infections, hearing loss (which is usually
22 temporary) or perforated ear drum
 - 23 – evidence that acute complications (such as mastoiditis) are rare whether
24 antibiotics are given or not
 - 25 – possible adverse effects, particularly diarrhoea and nausea.
- 26 • When no antibiotic prescription is given, give advice about:
 - 27 – the usual course of acute otitis media (3 days, can be up to 7 or 8 days)
 - 28 – an antibiotic not being needed
 - 29 – managing pain and fever with self-care (see the recommendations on
30 [self-care](#))

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- 1 – seeking medical help if symptoms deteriorate rapidly or significantly, do
2 not improve after 3 days, or the child becomes systemically very unwell.
- 3 • When a back-up antibiotic prescription is given, give advice about:
- 4 – an antibiotic not being needed immediately
- 5 – using the back-up (delayed) prescription if symptoms significantly
6 worsen, or do not improve within 3 days
- 7 – managing pain and fever with self-care (see the recommendations on
8 [self-care](#))
- 9 – seeking medical help if symptoms significantly worsen despite taking the
10 antibiotic, or the antibiotic has been stopped because it was not
11 tolerated.
- 12 See [symptoms and signs](#) of acute otitis media and a summary of the evidence
13 and committee discussion on [no antibiotic](#) and [back-up antibiotics](#).

1 **Children and young people with symptoms or signs of acute otitis media**
 2 **with otorrhoea (discharge following ear drum perforation) or children**
 3 **under 2 years with acute otitis media in both ears**

- 4 • Consider a [back-up antibiotic prescription](#) or an immediate antibiotic
 5 prescription (see the recommendations on [choice of antibiotic](#)) in line with
 6 the NICE guideline on [respiratory tract infections \(self-limiting\): prescribing](#)
 7 [antibiotics](#).

8 **Children and young people who are systemically very unwell, have**
 9 **symptoms and signs of a more serious illness or condition, or are at**
 10 **high-risk of serious complications because of pre-existing comorbidity**

- 11 • Offer an immediate antibiotic prescription (see the recommendations on
 12 [choice of antibiotic](#)) and/or further appropriate investigation and
 13 management in line with the NICE guideline on [respiratory tract infections](#)
 14 [\(self-limiting\): prescribing antibiotics](#).
- 15 • Refer children to hospital for emergency medical care if they have
 16 symptoms and signs of acute otitis media associated with:
 17 – a severe systemic infection (see the NICE guideline on [sepsis](#)), or
 18 – acute complications, including mastoiditis, meningitis, intracranial
 19 abscess, sinus thrombosis, or facial nerve paralysis.

20 See a summary of the evidence and committee discussion on [choice of](#)
 21 [antibiotic](#).

22 ***Choice of antibiotic***

23 **Children and young people under 18 years**

Antibiotic ¹	Dosage and course length ^{2,3}
First choice	
Amoxicillin	1 to 11 months, 125 mg three times a day for 7 days 1 to 4 years, 250 mg three times a day for 7 days 5 to 11 years, 500 mg three times a day for 7 days 12 to 17 years, 500 mg three times a day for 7 days
Alternative first choices for penicillin allergy or intolerance	
Clarithromycin	Under 8 kg, 7.5 mg/kg twice a day for 7 days 8 to 11 kg, 62.5 mg twice a day for 7 days

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	12 to 19 kg, 125 mg twice a day for 7 days 20 to 29 kg, 187.5 mg twice a day for 7 days 30 to 40 kg, 250 mg twice a day for 7 days 12 to 17 years, 250 mg twice a day or 500 mg twice a day for 7 days
Erythromycin (in pregnancy)	8 to 17 years ⁴ , 250 to 500 mg four times a day for 7 days or 500 to 1000 mg twice a day for 7 days
Second choice (worsening symptoms on first choice taken for at least 2 to 3 days)	
Co-amoxiclav	1 to 11 months, 0.25 ml/kg of 125/31 suspension three times a day for 7 days 1 to 5 years, 5 ml of 125/31 suspension three times a day or 0.25 ml/kg of 125/31 suspension three times a day for 7 days 6 to 11 years, 5 ml of 250/62 suspension three times a day or 0.15 ml/kg of 250/62 suspension three times a day for 7 days 12 to 17 years, 250/125 mg three times a day or 500/125 mg three times a day for 7 days
Alternative second choice for penicillin allergy or intolerance, or worsening symptoms on second choice taken for at least 2 to 3 days	
Consult local microbiologist	
¹ See BNF for children for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment. ² All doses are oral, except where indicated. ³ The age bands apply to children of average size and, in practice, the prescriber will use the age bands in conjunction with other factors such as the severity of the condition being treated and the child's size in relation to the average size of children of the same age. ⁴ Dose banding given for age group as in the BNF for children	

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2 See a summary of the evidence and committee discussion on [choice of](#)
 3 [antibiotic](#) and [antibiotic course length](#).

4 **Self-care**

- 5 • Offer paracetamol or ibuprofen for pain (assess and manage fever at home
 6 in children under 5 as outlined in the NICE guideline on [fever in under 5s](#)).
 7 – Paracetamol or ibuprofen need to be taken at the right time and at the
 8 right dose for the age or weight of the child, with maximum doses being
 9 used for severe pain (see [BNF for children](#) for dosing information).
 10 – Continue paracetamol or ibuprofen only as long as the child is
 11 distressed.
 12 – Consider a change to the other agent if the distress is not alleviated.

- 1 – Do not give paracetamol and ibuprofen simultaneously.
- 2 – Only consider alternating paracetamol and ibuprofen if the distress
- 3 persists or recurs before the next dose is due.
- 4
- 5 • Be aware that anaesthetic ear drops may improve pain when used with oral
- 6 analgesics in children aged 3 and over without perforation, but that no
- 7 anaesthetic ear drops are licensed for use in the UK.
- 8 • Explain that evidence does not support using decongestants or
- 9 antihistamines to help symptoms.
- 10 See a summary of the evidence and committee discussion on [self-care](#).

11 **Symptoms and signs**

12 ***Common symptoms and signs***

13 Children with acute otitis media usually present with acute onset of symptoms,

14 including:

- 15 • earache (in older children)
- 16 • pulling, tugging, or rubbing of the ear, or non-specific symptoms such as
- 17 fever, irritability, crying, poor feeding, restlessness at night, cough, or
- 18 rhinorrhoea (in younger children).

19 Examination with an otoscope may show signs of:

- 20 • a distinctly red, yellow or opaque ear drum
- 21 • moderate to severe bulging of the ear drum, with loss of normal landmarks
- 22 • an air-fluid level behind the ear drum
- 23 • perforation of the ear drum or discharge in the external auditory canal.

24 In babies (under 6 months) diagnosis can be difficult because of non-specific

25 symptoms or coexisting systemic illness; and examination with an otoscope

26 can be more challenging.

1 ***Children who may benefit from antibiotics***

2 It is difficult to distinguish viral and bacterial acute otitis media.

3 Subgroups who may be more likely to benefit from antibiotics are:

- 4 • children under 2 years with acute otitis media in both ears
- 5 • all children with acute otitis media and otorrhoea (discharge following ear
- 6 drum perforation).

7 **Summary of the evidence**

8 ***Self-care***

9 **Oral analgesia (paracetamol and ibuprofen)**

- 10 • A systematic review and meta-analysis of 3 randomised controlled trials
- 11 (RCTs) ([Sjoukes et al. 2016](#)) found that overall both paracetamol and
- 12 ibuprofen were effective in reducing the number of children with acute otitis
- 13 media with pain at 48 hours, compared with placebo (number needed to
- 14 treat [NNT] 6 to 7 for no pain at 48 hours; very low to low quality evidence).
- 15 There were no significant differences in fever at 48 hours with oral
- 16 analgesia compared with placebo.
- 17 • There were no significant differences in clinical effectiveness between
- 18 paracetamol and ibuprofen (very low to low quality evidence). Adding
- 19 ibuprofen to paracetamol was no more effective than using paracetamol
- 20 alone, although this was based on very small numbers of children (very low
- 21 to low quality evidence).
- 22 • There were no significant differences in adverse events for paracetamol,
- 23 ibuprofen and placebo (very low quality evidence). However, this should be
- 24 interpreted cautiously because of the small number of children and the
- 25 infrequent occurrence of adverse events.

26 **Topical analgesia (anaesthetic ear drops)**

- 27 • Overall, a systematic review and meta-analysis of 2 RCTs ([Foxlee et al.](#)
- 28 [2011](#)) found a significant increase in the proportion of children with a 50%

1 and a 25% reduction in pain after using anaesthetic ear drops compared
2 with placebo (NNT 4 for 50% pain reduction 10 minutes after receiving ear
3 drops; low quality evidence). These children were aged 3 years and over
4 without ear drum perforation and were also receiving oral analgesia, but not
5 an antibiotic.

- 6 • No adverse effects were observed with anaesthetic ear drops, but this was
7 based on very small numbers of children.

8 **Decongestants and antihistamines**

- 9 • Overall, a systematic review and meta-analysis of 15 RCTs ([Coleman et al.](#)
10 [2008](#)) found no significant benefits with decongestants or antihistamines in
11 children with acute otitis media who were taking antibiotics (used in 14 of
12 the 15 RCTs; very low quality evidence). There was a reduction in the rate
13 of persistent acute otitis media at 2 weeks with a combination of
14 decongestant plus antihistamine, compared with placebo (NNT 10; very low
15 quality evidence). However, subgroup analysis of higher quality studies
16 only found no benefit with treatment.
- 17 • There was a significant increase in adverse effects (excluding drowsiness
18 and hyperactivity) with decongestants, but not with antihistamines or a
19 combination of decongestant plus antihistamine, compared with placebo.
20 However, there is considerable uncertainty about these results.

Committee discussion on self-care

- The committee discussed the importance of managing a child's pain and felt that for parents this is the main priority. They agreed that paracetamol or ibuprofen needs to be taken at the right time and at the right dose, with maximum doses being used for severe pain.
- Based on evidence and their experience, the committee agreed that paracetamol or ibuprofen should be offered for pain associated with acute otitis media.
- Based on evidence, the committee agreed that anaesthetic ear drops (in addition to oral analgesics) may relieve pain in children aged 3 years and over without ear drum perforation, but there is no product licensed for use in the UK.
- The committee agreed that evidence does not support using decongestants or antihistamines to help symptoms of acute otitis media.

1 ***Oral corticosteroids***

- 2 • Evidence from 1 RCT ([Chonmaitree et al. 2003](#); n=91) found that oral
3 prednisolone taken for 5 days did not improve any clinical outcomes in
4 children aged 3 months to 6 years with acute otitis media who were at risk
5 of recurrence (at least 2 previous episodes of acute otitis media), compared
6 with placebo (very low quality evidence). Outcomes included treatment
7 failure during the first 2 weeks, duration of effusion and recurrence.
- 8 • There was no significant difference in adverse effects or discontinuations
9 because of adverse effects, although the study was very small and full data
10 were not reported.
- 11 • Systemic effects (mineralocorticoid and glucocorticoid) may occur with oral
12 corticosteroids, including a range of psychological or behavioural effects
13 (particularly in children; [Drug Safety Update, September 2010](#)).
- 14

Committee discussion on oral corticosteroids

- The committee agreed, based on the evidence, not to make a recommendation on the use of oral corticosteroids to manage acute otitis media in children.

1

2 **No antibiotic**

- 3 • Acute otitis media is a self-limiting infection of the middle ear. It can be
4 caused by viruses or bacteria, and both are often present at the same time.
5 In most children acute otitis media resolves without treatment, indicating a
6 viral infection alone or bacterial pathogens that are less virulent.
- 7 • The most common bacterial causes of acute otitis media are *Streptococcus*
8 *pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis* and
9 *Streptococcus pyogenes* ([Canadian Pediatric Society position statement](#)).
- 10 • More common complications of acute otitis media are recurrence of
11 infection, hearing loss (which is usually temporary) and perforated eardrum.
12 However, antibiotics make little difference to the rates of these (see efficacy
13 of antibiotics).
- 14 • Acute complications of acute otitis media (such as mastoiditis, meningitis,
15 intracranial abscess, sinus thrombosis, and facial nerve paralysis) are rare.
16 The incidence of mastoiditis after otitis media is 1.8 per 10,000 episodes
17 after antibiotics compared with 3.8 per 10,000 episodes without antibiotics.
18 This gives a NNT of 4831 to prevent 1 child from developing mastoiditis
19 ([Thompson et al. 2009](#)).

20 **Efficacy of antibiotics**

- 21 • A systematic review and meta-analysis ([Venekamp et al. 2015](#)) found
22 antibiotics did not significantly reduce pain at 24 hours compared with
23 placebo in children with acute otitis media (6 RCTs; high quality evidence);
24 around 60% of children in both groups had no pain. Antibiotics significantly
25 reduced pain at 2 to 3 days, but the absolute difference was small; 88% of

- 1 children had no pain in the antibiotic group compared with 84% in the
2 placebo group (NNT 24).
- 3 • Antibiotics significantly reduced the number of children with abnormal
4 tympanometry findings (a surrogate measure for hearing loss) compared
5 with placebo at 2 to 4 weeks, but not at 6 to 8 weeks or 3 months.
6 However, the absolute difference was small; at 2 to 4 weeks, 39% of
7 children had abnormal tympanometry findings with antibiotics compared
8 with 48% with placebo (NNT 12; 7 RCTs, low quality evidence; Venekamp
9 et al. 2015).
 - 10 • Antibiotics significantly reduced the number of children with ear drum
11 perforation. However, again the absolute benefits were small, with an NNT
12 of 33 (5% had perforation in the placebo group compared with 2% in the
13 antibiotic group; 5 RCTs, moderate quality evidence; Venekamp et al.
14 2015).
 - 15 • Antibiotics did not reduce the number of children with late recurrence of
16 acute otitis media (which was common in both groups: 18% of children
17 taking antibiotics compared with 20% of children taking placebo, moderate
18 quality evidence; Venekamp et al. 2015).
 - 19 • A meta-analysis of individual patient data from 6 RCTs (Venekamp et al.
20 2015) found that antibiotics seem to be most beneficial in 2 pre-defined
21 subgroups of children. Firstly, children under 2 years with bilateral acute
22 otitis media, where the NNT was 5 for symptom resolution (very low quality
23 evidence). Secondly, children with acute otitis media and otorrhoea
24 (discharge following ear drum perforation), where the NNT was 3 for
25 symptom resolution (very low quality evidence).

26 **Safety of antibiotics**

- 27 • Allergic reactions to penicillins occur in 1 to 10% of people and
28 anaphylactic reactions occur in less than 0.05%. People with a history of
29 atopic allergy (for example, asthma, eczema, and hay fever) have a higher
30 risk of anaphylactic reactions to penicillins. People with a history of
31 immediate hypersensitivity to penicillins may also react to cephalosporins
32 and other beta-lactam antibiotics ([BNF, March 2017](#)).

- 1 • Antibiotic-associated diarrhoea occurs in 2 to 25% of people taking
2 antibiotics, depending on the antibiotic used ([NICE Clinical Knowledge](#)
3 [Summary \[CKS\]: diarrhoea – antibiotic associated](#)).
- 4 • A systematic review and meta-analysis of 8 RCTs (Venekamp et al. 2015)
5 found significantly more adverse events (vomiting, diarrhoea or rash) in
6 children with acute otitis media taking antibiotics compared with those
7 taking placebo (moderate quality evidence). The number need to harm
8 (NNH) was 13.
- 9 • See the [summaries of product characteristics](#) for information on
10 contraindications, cautions and adverse effects of individual medicines.
11

Committee discussion on no antibiotics

- Acute otitis media can be caused by viral or bacterial infections, both of which are usually self-limiting and do not routinely need antibiotics.
- Based on evidence, the committee agreed that antibiotics make little difference to ear pain or to the rates of more common complications, such as recurrence of infection. The small increased risk of perforation was noted but 33 children would need to be treated with antibiotics to avoid 1 child experiencing perforation. Antibiotics also made little difference to hearing loss as assessed by the surrogate marker of tympanometry.
- More serious complications of acute otitis media, such as mastoiditis, are rare and the number needed to treat with antibiotics to prevent 1 child from developing mastoiditis run into thousands.
- The committee acknowledged the recommendation in the NICE guideline on [respiratory tract infections \(self-limiting\): prescribing antibiotics](#) for a no antibiotic or a [back-up antibiotic prescription](#) for most children with acute otitis media.

12

1 ***Back-up antibiotics***

- 2 • A systematic review and meta-analysis of 4 RCTs (Venekamp et al. 2015)
3 found that in children with acute otitis media there was no significant
4 difference in pain at 3 to 7 days with an immediate antibiotic prescribing
5 strategy compared with [back-up prescribing](#) or watchful waiting (moderate
6 quality evidence). There was also no significant difference between groups
7 for abnormal tympanometry findings (a surrogate measure for hearing
8 loss), ear drum perforation or recurrence of acute otitis media (very low to
9 low quality evidence).
- 10 • A systematic review of 3 RCTs ([Spurling et al. 2013](#)) compared a back-up
11 (delayed) antibiotic prescribing strategy with no antibiotic prescription and
12 immediate antibiotics. In 1 RCT there was no significant difference between
13 back-up antibiotics and no antibiotics for pain or fever on day 3 (very low
14 quality evidence). In 1 RCT there was no significant difference between
15 back-up antibiotics and immediate antibiotics for pain on day 3 (low quality
16 evidence).
- 17 • A systematic review and meta-analysis of 2 RCTs (Venekamp et al. 2015)
18 found that an immediate antibiotic prescribing strategy was associated with
19 a significantly increased risk of adverse events (vomiting, diarrhoea or
20 rash) compared with a delayed prescribing or watchful waiting prescribing
21 strategy (NNH 9; moderate quality evidence).
- 22 • A systematic review (Spurling et al. 2013) identified 2 RCTs that
23 considered the adverse effects of delayed antibiotics compared with
24 immediate antibiotics. No significant differences were identified between
25 groups for vomiting or rash (very low quality evidence), but there was
26 significantly less diarrhoea with delayed antibiotics compared with
27 immediate antibiotics (NNH 6 or 10; 2 RCTs, data not pooled; low to
28 moderate quality evidence). No data were available on back-up antibiotics
29 compared with no antibiotics.

Committee discussion on back-up (delayed) antibiotics

- Based on evidence, the committee agreed that no antibiotic prescription or a back-up (delayed) antibiotic prescription could be considered for most children with acute otitis media.
- The committee discussed that acute otitis media could have a viral or a bacterial cause, and distinguishing between these is difficult. However, both are usually self-limiting and do not routinely need antibiotics. The committee discussed that a back-up (delayed) antibiotic prescription may be preferred over no antibiotic in some children but that prescribers need to weigh up the small clinical benefits from antibiotics against their potential to cause adverse effects.
- The committee agreed that a back-up (delayed) antibiotic prescription could be used if symptoms significantly worsen or do not improve within 3 days (by which time most self-limiting infections would be starting to resolve).
- The committee acknowledged the recommendations in the NICE guideline on [respiratory tract infections \(self-limiting\): prescribing antibiotics](#) that, for acute otitis media, a no antibiotic prescribing strategy or a delayed antibiotic prescribing strategy should be agreed, but that depending on clinical assessment of severity, immediate antibiotics can also be considered for children under 2 years with acute otitis media in both ears or children of any age with otorrhoea (discharge following perforation of the ear drum). For these subgroups the committee agreed that a back-up (delayed) antibiotic prescription or an immediate antibiotic prescription should be considered rather than no antibiotic, because antibiotics are more beneficial in these subgroups.
- The committee agreed that immediate antibiotics are important for children who are systemically very unwell, have symptoms or signs of a more serious illness, or are at high risk of serious complications because of pre-existing comorbidity. This includes children with significant heart, lung, renal, liver or neuromuscular disease, immunosuppression, cystic fibrosis, and young children who were born prematurely.

1

2 ***Choice of antibiotic***

- 3 • Overall, evidence from 1 systematic review and meta-analysis ([Shekelle et](#)
4 [al. 2010](#)) did not suggest major differences in treatment success between
5 classes of antibiotics, including penicillins, cephalosporins and macrolides
6 for treating children with uncomplicated acute otitis media. There was no
7 difference in treatment success between ampicillin or amoxicillin compared
8 with ceftriaxone; co-amoxiclav compared with ceftriaxone; co-amoxiclav
9 compared with azithromycin; or cefaclor compared with azithromycin.
- 10 • Overall, the systematic review (Shekelle et al. 2010) concluded that
11 co-amoxiclav was associated with significantly more adverse events than a
12 cephalosporin (NNH 3 to 6; very low quality evidence) or azithromycin
13 (NNH 5; moderate quality evidence).
- 14 • Shekelle et al. (2010) also considered evidence for treating children with
15 recurrent or persistent acute otitis media. None of the studies found a
16 significant benefit in treatment success for any particular antibiotic (low
17 quality evidence). There were 5 individual RCTs which compared different
18 antibiotic treatments: co-amoxiclav compared with gatifloxacin (2 RCTs),
19 co-amoxiclav compared with levofloxacin (1 RCT), co-amoxiclav compared
20 with azithromycin (1 RCT) and cefaclor compared with cefuroxime (1 RCT).

Committee discussion on choice of antibiotic

- Based on evidence of no major differences in clinical effectiveness between classes of antibiotics, the committee agreed that the choice of antibiotic should largely be driven by minimising the risk of resistance.
- The committee discussed that, if an antibiotic is needed to treat an infection that is not life-threatening, a narrow-spectrum antibiotic should generally be first choice. Indiscriminate use of broad-spectrum antibiotics creates a selective advantage for bacteria resistant even to these 'last-line' broad-spectrum agents, and also kills normal commensal flora leaving people susceptible to antibiotic-resistant harmful bacteria such as *Clostridium difficile*. For infections that are not life threatening, broad-spectrum antibiotics need to be reserved for second-choice treatment when narrow-spectrum antibiotics are ineffective.
- Based on evidence, their experience and resistance data, the committee agreed to recommend **amoxicillin** as the first choice because this is current practice for antibiotic treatment in children with acute otitis media, and the risk of resistance is acceptable. The dosage of 125 mg to 500 mg three times a day (based on age) is the usual dose, and was similar to that used in studies in the evidence review. The committee discussed that penicillin V has a lower risk of resistance than amoxicillin, and microbiologically would be expected to be equivalent. However, adherence is particularly important for children. Amoxicillin has a three times a day dosage rather than four times a day for penicillin V, and is more palatable.
- Based on evidence, their experience and resistance data, the committee agreed to recommend **clarithromycin** (or **erythromycin** in pregnancy) as the alternative first-choice antibiotic for use in penicillin allergy or amoxicillin intolerance. The dosage of 62.5 mg to 250 mg or 500 mg twice a day (based on weight and age) for clarithromycin is the usual dose for children, and was similar to that used in studies in the evidence review. The committee discussed that there was evidence for another macrolide, azithromycin. However, they agreed not to recommend this

because clarithromycin is current practice for antibiotic treatment for children with acute otitis media who have penicillin allergy or are intolerant to amoxicillin, and azithromycin should be reserved for more serious infections.

- Based on evidence, their experience and resistance data, the committee agreed to recommend **co-amoxiclav** as the second-choice antibiotic for use if symptoms get worse on a first-choice antibiotic taken for at least 2 to 3 days. This broad-spectrum treatment combines a penicillin (amoxicillin) with a beta-lactamase inhibitor, making it active against beta-lactamase-producing bacteria that are resistant to amoxicillin alone. People who do not respond to amoxicillin may be more likely to have an infection that is resistant to it. The dosage of 0.25 ml/kg of 125/31 suspension to 250/125 mg or 500/125 mg three times a day (based on weight and age) is the usual dose for children, and was similar to that used in studies in the evidence review.

1

2 ***Antibiotic course length***

- 3 • One systematic review ([Kozyrskyj et al. 2010](#)) reported significantly higher
4 treatment failure at 8 to 19 days, or 1 month or less, with a short course of
5 antibiotics (more than 48 hours but less than 7 days) compared with a long
6 course (7 days or longer). Treatment failure (which was defined as a lack of
7 clinical resolution, relapse or recurrence of acute otitis media within
8 1 month of starting treatment) occurred in 21% of the short-course group
9 compared with 18% of the long-course group at 1 month or less (NNT 34;
10 16 RCTs; low quality evidence). However, there was no difference in
11 treatment failure between short and long courses at other time points.
- 12 • One systematic review (Kozyrskyj et al. 2010) found significantly fewer
13 gastrointestinal adverse events with a short course of antibiotics (more than
14 48 hours but less than 7 days) compared with a long course (7 days or
15 longer; NNH 21; low quality evidence).

Committee discussions on antibiotic course length

- The committee agreed that, when an antibiotic is appropriate, the shortest course that is likely to be effective should be prescribed to minimise the risk of resistance.
- Based on evidence, their experience and resistance data, the committee agreed that a 7-day course of all the recommended antibiotics was sufficient to treat acute otitis media in children. This takes into account both the evidence for clinical effectiveness and the evidence for safety and tolerability of antibiotics, and minimises the risk of resistance. Studies on the use of specific antibiotics to treat acute otitis media sometimes had longer course lengths than 7 days.

1

2 Antibiotic dose frequency

- 3 • One systematic review of 5 RCTs ([Thanaviratananich et al. 2013](#)) found no
4 significant difference in clinical cure rates at the end of antibiotic treatment
5 with once or twice daily dosing of amoxicillin or co-amoxiclav compared
6 with three times a day dosing (high quality evidence). The duration of
7 treatment was 10 days in most studies, and the dose of amoxicillin or co-
8 amoxiclav varied. There were no significant differences in the rates of
9 recurrence (very low quality evidence), adverse effects (very low quality
10 evidence) and adherence (moderate quality evidence).

Committee discussions on antibiotic dose frequency

- The committee agreed that, when prescribing amoxicillin or co-amoxiclav, a dosing frequency of three times a day should be prescribed, as is current practice. The committee discussed that there is evidence for once or twice daily dosing of amoxicillin and co-amoxiclav, but it is unknown if this would have a detrimental effect on the risk of resistance to these antibiotics. The evidence supporting once or twice daily dosing is for different doses and longer treatment durations. This goes against the general principle of antimicrobial stewardship to prescribe the shortest course that is effective.

1

2 Other considerations

3 *Medicines adherence*

- Medicines adherence may be a problem for some people with medicines that require frequent dosing (for example, some antibiotics) or longer treatment duration (see the NICE guideline on [medicines adherence](#)).

7 *Resource implications*

- Respiratory tract infections, including acute otitis media, are a common reason for consultations in primary care, and therefore are a common reason for potential antibiotic prescribing.
- There is potential for resource savings if a no antibiotic or a back-up (delayed) antibiotic prescription strategy is used. In 1 systematic review ([Spurling et al. 2013](#)), there was significantly lower antibiotic use with a delayed antibiotic prescribing strategy compared with immediate antibiotics, both when the delayed prescription was given at the time of consultation (38% compared with 87%; 1 RCT; high quality evidence) and when the prescription had to be collected on a separate visit (24% compared with 87%; 1 RCT; high quality evidence). There was no significant difference between groups in re-consultation rates (very low quality evidence).

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- 1 • Recommended antibiotics are all available as generic formulations, see
- 2 [Drug Tariff](#) for costs
- 3
- 4 See the full evidence review for more information