

# Sinusitis (acute): antimicrobial prescribing

NICE guideline

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## Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the [Yellow Card Scheme](#).

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should [assess and reduce the environmental impact of implementing NICE recommendations](#) wherever possible.

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This guideline partially replaces CG69.

This guideline is the basis of QS210.

## Overview

This guideline sets out an antimicrobial prescribing strategy for acute sinusitis. It aims to limit antibiotic use and reduce antimicrobial resistance. Acute sinusitis is usually caused by a virus, lasts for about 2 to 3 weeks, and most people get better without antibiotics. Withholding antibiotics rarely leads to complications.

See a [2-page visual summary of the recommendations](#), including tables to support prescribing decisions.

There is also a [NICE guideline on antimicrobial stewardship: systems and processes for effective antimicrobial medicine use](#).

## Who is it for?

- Health professionals
- People with acute sinusitis and their families and carers

## Background

- Acute sinusitis (also known as rhinosinusitis) is self-limiting and usually triggered by a viral infection of the upper respiratory tract (for example, a common cold).
- Only about 2% of cases are complicated by bacterial infection, but it is very difficult to distinguish these.
- Symptoms can last for 2 to 3 weeks – most people will get better within this time without treatment, regardless of cause (bacteria or virus).
- Antibiotics are not needed for most people. The number of people improving with antibiotics is similar to the number getting adverse effects, such as diarrhoea.
- Complications of acute sinusitis are rare (about 2.5 to 4.3 per million people per year). Withholding antibiotics is unlikely to lead to complications.
- Previous antibiotic use may lead to resistant organisms if the same antibiotic is used again.

# Recommendations

## 1.1 Managing acute sinusitis

### People presenting with symptoms for around 10 days or less

1.1.1 Do not offer an antibiotic prescription.

1.1.2 Give advice about:

- the usual course of acute sinusitis (2 to 3 weeks)
- an antibiotic not being needed
- managing symptoms, including fever, with self-care (see the [recommendations on self-care](#))
- seeking medical help if symptoms worsen rapidly or significantly, do not improve after 3 weeks, or they become systemically very unwell.

1.1.3 Reassess if symptoms worsen rapidly or significantly, taking account of:

- alternative diagnoses such as a dental infection
- any symptoms or signs suggesting a more serious illness or condition.

See [symptoms and signs](#) of acute sinusitis and the [evidence and committee discussion on no antibiotic](#).

### People presenting with symptoms for around 10 days or more with no improvement

1.1.4 Consider prescribing a high-dose nasal corticosteroid for 14 days for adults and children aged 12 years and over, being aware that nasal corticosteroids:

- may improve symptoms but are not likely to affect how long they last

- could cause systemic effects, particularly in people already taking another corticosteroid
- may be difficult for people to use correctly.

High-dose nasal corticosteroids used in the studies were mometasone 200 micrograms twice a day and fluticasone 110 micrograms twice a day. This is an off-label use of nasal corticosteroids See [NICE's information on prescribing medicines](#).

See the [evidence and committee discussion on nasal corticosteroids](#).

1.1.5 Consider no antibiotic prescription or a [back-up antibiotic prescription](#) (see the [recommendations on choice of antibiotic](#)), taking account of:

- evidence that antibiotics make little difference to how long symptoms last, or the proportion of people with improved symptoms
- withholding antibiotics is unlikely to lead to complications
- possible adverse effects, particularly diarrhoea and nausea
- factors that might make a bacterial cause more likely (see [symptoms and signs](#)).

1.1.6 When a back-up antibiotic prescription is given, give verbal and written advice about:

- managing symptoms, including fever, with self-care (see the [recommendations on self-care](#))
- an antibiotic not being needed immediately
- using the back-up prescription if symptoms do not improve within 7 days or if they worsen rapidly or significantly at any time
- seeking medical help if symptoms worsen rapidly or significantly despite taking the antibiotic, or the antibiotic has been stopped because it was not tolerated.

1.1.7 Reassess if symptoms worsen rapidly or significantly despite taking treatment, taking account of:

- alternative diagnoses such as a dental infection
- any signs or symptoms suggesting a more serious illness or condition
- previous antibiotic use, which may lead to resistant organisms.

See the [evidence and committee discussion on back-up antibiotics](#).

## **People presenting at any time who are systemically very unwell, have symptoms and signs of a more serious illness or condition, or are at high risk of complications**

1.1.8 Offer an immediate antibiotic prescription (see the [recommendations on choice of antibiotic](#)).

1.1.9 Refer people to hospital if they have symptoms and signs of acute sinusitis associated with any of the following:

- a severe systemic infection (see the [NICE guideline on sepsis](#))
- intraorbital or periorbital complications, including periorbital oedema or cellulitis, a displaced eyeball, double vision, ophthalmoplegia, or newly reduced visual acuity
- intracranial complications, including swelling over the frontal bone, symptoms or signs of meningitis, severe frontal headache, or focal neurological signs.

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

## **1.2 Choice of antibiotic**

1.2.1 When prescribing antibiotics for acute sinusitis:

- follow the recommendations in table 1 for adults aged 18 years and over
- follow the recommendations in table 2 for children and young people under



18 years.

Table 1 Antibiotics for adults aged 18 years and over

Treatment	Antibiotic, dosage and course length
First-choice oral antibiotic	<b>Phenoxymethylpenicillin:</b> 500 mg four times a day for 5 days
First choice if systemically very unwell, symptoms and signs of a more serious illness or condition, or at high risk of complications	<b>Co-amoxiclav:</b> 500/125 mg three times a day for 5 days
Alternative first choices for penicillin allergy or intolerance (for people who are not pregnant)	<b>Doxycycline:</b> 200 mg on first day, then 100 mg once a day for 4 days (5-day course in total) <b>Clarithromycin:</b> 500 mg twice a day for 5 days
Alternative first choice for penicillin allergy in pregnancy	<b>Erythromycin:</b> 250 mg to 500 mg four times a day or 500 mg to 1,000 mg twice a day for 5 days Erythromycin is preferred if a macrolide is needed in pregnancy, for example, if there is true penicillin allergy and the benefits of antibiotic treatment outweigh the harms. See the <a href="#">Medicines and Healthcare products Regulatory Agency (MHRA) Public Assessment Report on the safety of macrolide antibiotics in pregnancy</a> .
Second-choice oral antibiotic (worsening symptoms on first choice taken for at least 2 to 3 days)	<b>Co-amoxiclav:</b> 500/125 mg three times a day for 5 days

Treatment	Antibiotic, dosage and course length
<b>Alternative second choice for penicillin allergy or intolerance, or worsening symptoms on second choice taken for at least 2 to 3 days</b>	Consult a local microbiologist

See the [BNF](#) for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breast-feeding.

If co-amoxiclav has been used first choice, consult a local microbiologist for advice on second choice.

**Table 2 Antibiotics for children and young people under 18 years**

Treatment	Antibiotic, dosage and course length
<b>First-choice oral antibiotic</b>	<p><b>Phenoxymethylpenicillin:</b></p> <p>1 months to 11 months, 62.5 mg four times a day for 5 days</p> <p>1 year to 5 years, 125 mg four times a day for 5 days</p> <p>6 years to 11 years, 250 mg four times a day for 5 days</p> <p>12 years to 17 years, 500 mg four times a day for 5 days</p>
<b>First choice if systemically very unwell, symptoms and signs of a more serious illness or condition, or at high risk of complications</b>	<p><b>Co-amoxiclav:</b></p> <p>1 month to 11 months, 0.25 ml/kg of 125/31 suspension three times a day for 5 days</p> <p>1 year 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 5 days</p> <p>6 years 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 5 days</p> <p>12 years to 17 years, 250/125 mg three times a day or 500/125 mg three times a day for 5 days</p>

Treatment	Antibiotic, dosage and course length
<p><b>Alternative first choices for penicillin allergy or intolerance (for people who are not pregnant)</b></p>	<p><b>Clarithromycin:</b></p> <p>Under 8 kg, 7.5 mg/kg twice a day for 5 days  8 kg to 11 kg, 62.5 mg twice a day for 5 days  12 kg to 19 kg, 125 mg twice a day for 5 days  20 kg to 29 kg, 187.5 mg twice a day for 5 days  30 kg to 40 kg, 250 mg twice a day for 5 days  12 years to 17 years, 250 mg twice a day or 500 mg twice a day for 5 days</p> <p><b>Doxycycline:</b></p> <p>12 years to 17 years, 200 mg on first day, then 100 mg once a day for 4 days (5-day course in total)</p> <p>Doxycycline is contraindicated in children under 12 years</p>
<p><b>Alternative first choice for penicillin allergy in pregnancy</b></p>	<p><b>Erythromycin:</b></p> <p>8 years to 17 years, 250 mg to 500 mg four times a day or 500 mg to 1,000 mg twice a day for 5 days</p> <p>Erythromycin is preferred if a macrolide is needed in pregnancy, for example, if there is true penicillin allergy and the benefits of antibiotic treatment outweigh the harms. See the <a href="#">Medicines and Healthcare products Regulatory Agency (MHRA) Public Assessment Report on the safety of macrolide antibiotics in pregnancy</a>.</p>
<p><b>Second-choice oral antibiotic (worsening symptoms on first choice taken for at least 2 to 3 days)</b></p>	<p><b>Co-amoxiclav:</b></p> <p>1 month to 11 months, 0.25 ml/kg of 125/31 suspension three times a day for 5 days</p> <p>1 year 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 5 days</p> <p>6 years 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 5 days</p> <p>12 years to 17 years, 250/125 mg three times a day or 500/125 mg three times a day for 5 days</p>

Treatment	Antibiotic, dosage and course length
<b>Alternative second choice for penicillin allergy or intolerance, or worsening symptoms on second choice taken for at least 2 to 3 days</b>	Consult a local microbiologist

See the [BNF for children](#) for appropriate use and dosing in specific populations, for example, hepatic impairment and renal impairment.

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.

If co-amoxiclav used as first choice, consult a local microbiologist for advice on second choice.

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

## 1.3 Self-care

- 1.3.1 Consider paracetamol or ibuprofen for pain or fever (assess and manage children aged under 5 who present with fever as outlined in the [NICE guideline on fever in under 5s](#)).
- 1.3.2 Explain that some people may wish to try nasal saline or nasal decongestants, although there is not enough evidence to show that they help to relieve nasal congestion.
- 1.3.3 Explain that no evidence was found for using oral decongestants, antihistamines, mucolytics, steam inhalation, or warm face packs.

See the [evidence and committee discussion on self-care](#).

# Symptoms and signs

## Common symptoms and signs

- Adults with acute sinusitis usually present with:
  - nasal blockage or congestion
  - nasal discharge
  - dental or facial pain or pressure
  - reduction or loss of the sense of smell.
- Children (particularly young children) often present with non-specific symptoms in the upper respiratory tract. Symptoms of acute sinusitis in children may include the following, but these can be present for many upper respiratory tract infections:
  - nasal blockage or congestion
  - discoloured nasal discharge
  - cough during the day or at night.

## Factors that might make a bacterial cause more likely

It is difficult to distinguish viral and bacterial acute sinusitis. A bacterial cause may be more likely if several of the following are present:

- symptoms for more than 10 days
- discoloured or purulent nasal discharge
- severe localised unilateral pain (particularly pain over teeth and jaw)
- fever
- marked deterioration after an initial milder phase.

# Summary of the evidence

## Self-care

### Nasal saline

- Nasal saline for up to 28 days did not reduce the time to resolution of symptoms in adults. This was based on very low quality evidence from a systematic review of randomised controlled trials (RCTs) ([King et al. 2015](#)). In the largest trial, in children aged 6 to 10 years, there were statistically significant reductions in nasal symptom scores, but these may not be clinically important (low quality evidence).
- Nasal saline irrigation is safe but may cause minor adverse effects, such as irritation (low to moderate quality evidence).

### Nasal decongestants

- Nasal decongestants offered no benefit in children compared with either placebo or mineral salts. This was based on a systematic review of RCTs ([Smith et al. 2013](#); low quality evidence). No systematic reviews or RCTs of nasal decongestants in adults were identified.
- Nasal decongestants containing sympathomimetics can cause rebound congestion and should not be used for longer than 7 days ([BNF information on the nose](#)).

### Other interventions

- No systematic reviews or RCTs of steam inhalation or applying warm face packs were identified.
- No systematic reviews or RCTs of paracetamol or ibuprofen were identified. However, these medicines have a well-established efficacy and safety profile for managing pain and fever.
- No systematic reviews or RCTs of oral decongestants, antihistamines or mucolytics were identified.

### Committee discussion on self-care

- Based on experience, the committee agreed that it was reasonable to consider paracetamol or ibuprofen for acute sinusitis despite no evidence for their use in this condition. This is because these medicines have well-established efficacy and safety profiles for managing pain and fever generally.
- Based on experience, the committee agreed that people with acute sinusitis may wish to try self-care with nasal saline or nasal decongestants to relieve nasal congestion, but it should be explained that there is not enough evidence to recommend these. It should be explained to people that no evidence was found for using oral decongestants, antihistamines, mucolytics, steam inhalation or warm face packs in acute sinusitis.

## Nasal corticosteroids

- High-dose nasal corticosteroids (equivalent to mometasone 400 micrograms a day) for 14 to 21 days (with or without an antibiotic) produced a statistically significant improvement in symptoms in adults and children aged 12 years and over compared with placebo. This was based on high quality evidence from a systematic review of RCTs ([Zalmanovici Trestioreanu et al. 2013](#)) and moderate quality evidence from 1 additional RCT ([Keith et al. 2012](#)). However, it is not clear whether this statistically significant reduction in symptom score is clinically important. The number needed to treat (NNT) was 17 for 1 additional person with acute sinusitis to have improved or resolved symptoms with a high-dose nasal corticosteroid compared with placebo. Lower doses (equivalent to mometasone 200 micrograms a day) were not significantly better than placebo.
- Mometasone 200 micrograms twice a day produced a statistically significant reduction in symptoms compared with mometasone 200 micrograms once a day and compared with amoxicillin 500 mg three times a day for 10 days. This was based on 1 RCT ([Meltzer et al. 2005](#)), which excluded people with suspected acute bacterial sinusitis and compared nasal corticosteroids alone with antibiotics (moderate quality evidence).
- Systemic effects (mineralocorticoid and glucocorticoid) may occur with nasal corticosteroids, including a range of psychological or behavioural effects (particularly

in children) ([Drug Safety Update, September 2010](#)).

- Adverse events for nasal corticosteroids in the studies were not significantly different from placebo (low to moderate quality evidence).
- The steroid burden of nasal corticosteroids needs to be considered in people already taking oral or inhaled corticosteroids ([Ekins-Daukes et al. 2002](#)), particularly in children due to systemic effects.

### Committee discussion on nasal corticosteroids

- The committee agreed, based on the evidence, that a high-dose nasal corticosteroid could be considered for adults and children aged 12 years and over presenting with prolonged symptoms of acute sinusitis (symptoms for more than 10 days with no improvement).
- However, the committee discussed that prescribers need to weigh up the small improvement in symptoms, which may not be clinically important, against possible systemic effects. The committee also recognised that it may be difficult for some people to use a nasal spray correctly.
- The committee acknowledged that some of the evidence did not include people with a suspected bacterial cause of acute sinusitis.

## No antibiotic

- Acute sinusitis is a self-limiting infection usually triggered by a viral infection, so most people will not benefit from an antibiotic.
- Only 0.5% to 2.2% of acute viral sinusitis becomes complicated by a bacterial infection ([International Consensus Statement on Allergy and Rhinology: rhinosinusitis](#)). The most common bacterial causes are *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis* and *Staphylococcus aureus* ([EPOS 2012 position paper](#)).
- Complications of acute sinusitis are rare, with an incidence in large epidemiological studies of 2.5 to 4.3 per million people per year ([International Consensus Statement on Allergy and Rhinology: rhinosinusitis](#)). The most common complications are orbital,



then intracranial, with osseous complications being least common (International Consensus Statement on Allergy and Rhinology: rhinosinusitis). In a Dutch study ([Hansen et al. 2012](#)), severe complications were estimated to occur in 1:12,000 children and 1:32,000 adults with acute sinusitis who were otherwise healthy.

## Efficacy of antibiotics

- Antibiotics did not significantly increase the proportion of adults with cure or improvement at 3 to 5 days follow-up compared with placebo (very low quality evidence). At longer durations of follow-up (approximately 7 to 15 days), there was a statistically significant difference in effectiveness for antibiotics compared with placebo, although the clinical difference in cure, improvement or clinical failure is small (moderate quality evidence). This benefit was not maintained in the longer term (approximately 16 to 60 days follow-up) (low to moderate quality evidence). Where statistically significant benefits were seen for antibiotics compared with placebo, the NNT ranged between 7 and 21 depending on the outcomes considered, with little effect on the duration of illness. This was based on evidence from 3 systematic reviews and meta-analyses of RCTs ([Ahovuo-Saloranta et al. 2014](#), [Falagas et al. 2008](#) and [Rosenfeld et al. 2007](#)).
- The NNT was 15 for 1 additional person with acute sinusitis to be cured with antibiotics, based on a meta-analysis of individual patient data ([Young et al. 2008](#)). Common clinical symptoms and signs could not confidently identify subgroups of people who may benefit from antibiotics, although people with purulent nasal discharge in the pharynx (observed by the doctor) had some prognostic value in identifying people who were more likely to benefit (NNT 8).
- Antibiotics produced variable results in children, based on evidence from 2 systematic reviews ([Cronin et al. 2013](#) and [Falagas et al. 2008](#)). In 1 systematic review, more children had symptom improvement at 10 to 14 days follow-up with antibiotics compared with placebo (NNT 8; low quality evidence). However, in the other systematic review, antibiotics did not significantly increase cure or improvement compared with placebo (moderate quality evidence).

## Safety of antibiotics

- Allergic reactions to penicillins occur in 1 to 10% of people and anaphylactic reactions occur in less than 0.05%. People with a history of atopic allergy (for example, asthma,

eczema, and hay fever) are at a higher risk of anaphylactic reactions to penicillins. People with a history of immediate hypersensitivity to penicillins may also react to cephalosporins and other beta-lactam antibiotics ([BNF information on phenoxymethylpenicillin](#)).

- Antibiotic-associated diarrhoea is estimated to occur in 2 to 25% of people taking antibiotics, depending on the antibiotic used ([NICE clinical knowledge summary \[CKS\]: diarrhoea – antibiotic associated](#)).
- Antibiotics were associated with significantly more adverse events than placebo. The [number need to harm](#) (NNH) ranged between 8 and 11 for all adverse effects, and was about 18 for diarrhoea. This was based on low to high quality evidence from 3 systematic reviews ([Falagas et al. 2008](#), [Lemiengre et al. 2012](#) and [Rosenfeld et al. 2007](#)).
- See the [summaries of product characteristics](#) for information on contraindications, cautions and adverse effects of individual medicines.

### Committee discussion on no antibiotics

- Acute sinusitis usually follows a common cold, and symptoms for around 10 days or less are more likely to be associated with a cold rather than viral or bacterial acute sinusitis. Therefore, the committee agreed that an antibiotic prescription should not be offered to people presenting with acute sinusitis symptoms for around 10 days or less.
- Prolonged symptoms (for around 10 days or more with no improvement) could be due to either viral or bacterial acute sinusitis. Viral acute sinusitis is more likely, but even bacterial sinusitis is usually self-limiting and does not routinely need antibiotics.
- The committee recognised that people with symptoms that worsen rapidly or significantly should be reassessed to rule out alternative diagnoses and to identify any signs or symptoms suggesting a more serious illness or condition.
- The committee acknowledged the recommendation in the previous NICE guideline on upper respiratory tract infections for a 'no' or back-up (delayed) antimicrobial prescribing strategy in acute sinusitis.

## Back-up antibiotics

- A back-up antibiotic prescription (either patient-led collection or delayed collection) or no antibiotic prescription was as effective as an immediate antibiotic prescription for managing upper respiratory tract infections (including acute sinusitis). This was based on low to moderate quality evidence from 1 RCT in adults (de la Poza Abad et al. 2015). No systematic reviews or RCTs of back-up antibiotic prescribing in children were identified.
- There were no significant differences in adverse events between back-up antibiotic prescription and no prescription strategies, compared with an immediate antibiotic prescription. This was based on low quality evidence from 1 RCT in adults (de la Poza Abad et al. 2015).

## Committee discussion on back-up antibiotics

- Based on evidence, the committee agreed that no antibiotic prescription or a back-up antibiotic prescription could be considered for people presenting with prolonged acute sinusitis symptoms (symptoms for around 10 days or more with no improvement).
- The committee discussed that prescribers need to weigh up the small clinical benefits from antibiotics against their potential to cause adverse effects.
- A back-up antibiotic prescription could be used if symptoms worsen rapidly or significantly, or do not improve within the next 7 days (by which time most self-limiting acute sinusitis infections would be starting to resolve).
- The committee recognised that people with symptoms that worsen rapidly or significantly despite taking an antibiotic should be reassessed to rule out alternative diagnoses and to identify any signs or symptoms suggesting a more serious illness or condition. They were aware that previous antibiotic use may lead to resistant organisms if the same antibiotic is used again (see the [committee discussion on choice of antibiotic](#)).
- The committee discussed that prolonged acute sinusitis symptoms could have a viral or a bacterial cause, and distinguishing between these is difficult. Viral acute sinusitis is more likely, but a bacterial cause may be more likely if several of the following are present: symptoms for more than 10 days, discoloured or purulent nasal discharge, severe localised unilateral pain (particularly pain over teeth and jaw), fever, or marked deterioration after an initial milder phase. The committee discussed that a back-up antibiotic may be preferred when multiple factors suggest a bacterial cause is more likely.
- The committee acknowledged the recommendations in the previous NICE guideline on upper respiratory tract infections for a 'no' or a back-up antimicrobial prescribing strategy in acute sinusitis. An immediate antibiotic prescription is not recommended unless people are systemically very unwell, have symptoms and signs of a more serious illness, or are at high risk of serious complications because of pre-existing comorbidity.

## Choice of antibiotic

- There were no major differences in clinical effectiveness between classes of antibiotics, including penicillins, cephalosporins, macrolides, tetracyclines, folate inhibitors and quinolones. This was based on very low to moderate quality evidence from 2 systematic reviews and meta-analyses of RCTs in adults ([Ahovuo-Saloranta et al. 2014](#) and [Karageorgopoulos et al. 2008](#)). Some differences that were statistically significant were seen for some comparisons, for some end points at some time points only.
- Phenoxyethylpenicillin and amoxicillin were similar in terms of cure and improvement at 10 days (2 RCTs from the systematic reviews; moderate to high quality evidence) and 14 to 16 days (1 RCT from the systematic reviews; moderate quality evidence). There was no significant difference in duration of illness in 2 RCTs, and in 1 RCT the duration of illness was significantly lower with either amoxicillin or phenoxyethylpenicillin, compared with placebo (moderate quality evidence).
- There were no significant differences between the antibiotics used in the studies in 1 systematic review in children ([Smith 2013](#); low to very low quality evidence).
- There were significantly fewer drop-outs because of adverse effects in studies of cephalosporins (1.3%) or macrolides (2.1%), compared with co-amoxiclav (4.4% or 4.8%). This was based on high quality evidence from 1 systematic review in adults ([Ahovuo-Saloranta et al. 2014](#)). In a further systematic review ([Karageorgopoulos et al. 2008](#)), results varied for different safety outcomes, but overall there did not appear to be differences between quinolones and beta-lactam antibiotics (very low quality evidence).
- There were no significant differences in adverse events between phenoxyethylpenicillin and amoxicillin reported in the 3 RCTs included in the systematic reviews (low to moderate quality evidence).
- There were no significant differences in adverse events between classes of antibiotics in 1 systematic review in children ([Smith et al. 2013](#); very low quality evidence).

## 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 recognised the need to balance a person's need for antibiotics against their risk of developing a resistant organism following antibiotic treatment. The committee was aware of evidence that the risk of resistance to amoxicillin is increased following a course of amoxicillin. The effect is greatest in the month immediately after treatment but may persist for up to 12 months.
- 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 *C. 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 the narrow-spectrum antibiotic **phenoxymethylpenicillin** as the first choice. Phenoxymethylpenicillin has a narrower spectrum of activity than amoxicillin and its use will have the lowest risk of resistance, while having equivalent microbiological activity to amoxicillin. The committee agreed that organisms causing acute sinusitis that are resistant to phenoxymethylpenicillin are also likely to be resistant to amoxicillin.
- The dosage of phenoxymethylpenicillin 500 mg four times a day agreed for adults (with corresponding usual doses in children), is lower than that used in studies in the evidence review, but dose formulations to give these higher doses are not available in the UK.
- Based on evidence, their experience and resistance data, the committee agreed to recommend **co-amoxiclav** as the first-choice antibiotic for people presenting at any time who are systemically very unwell, have symptoms and signs of a more serious illness or condition, or are at high risk of complications. These people are

more likely to have an infection that is resistant to phenoxymethylpenicillin. Co-amoxiclav is a broad-spectrum antimicrobial that combines a penicillin (amoxicillin) with a beta-lactamase inhibitor, making it active against beta-lactamase-producing bacteria that are resistant to amoxicillin alone. The dosage of 500/125 mg three times a day for adults (with corresponding usual doses in children) was used in studies in the evidence review.

- Based on evidence, their experience and resistance data, the committee agreed to recommend the following alternative first-choice antibiotics for use in penicillin allergy or phenoxymethylpenicillin intolerance:
  - **doxycycline** (a tetracycline; adults and young people over 12 years only). The dosage of doxycycline 200 mg on the first day, then 100 mg once a day for a further 4 days was used in studies in the evidence review.
  - **clarithromycin** (a macrolide). The dosage of clarithromycin 500 mg twice a day for adults (with corresponding usual doses in children) was used in studies in the evidence review.
- In pregnancy, **erythromycin** was recommended if there is true penicillin allergy. No studies of erythromycin were included in the evidence review, so the committee discussed and agreed a dosage of 250 mg to 500 mg four times a day or 500 mg to 1000 mg twice a day.
- The committee also discussed the [MHRA Public Assessment Report on the safety of macrolide antibiotics in pregnancy](#). This found that the available evidence is insufficient to confirm with certainty whether there is a small increased risk of birth defects or miscarriage when macrolides are taken in early pregnancy. They agreed with the [UK Teratology Information Service monograph on the use of macrolides in pregnancy](#). They decided that there should be an informed discussion of the potential benefits and harms of treatment. Then, after such a discussion, macrolides can be used if there is a compelling clinical need and there are no suitable alternatives with adequate pregnancy safety data. Erythromycin is the preferred choice if a macrolide is needed during pregnancy, for example, if there is true penicillin allergy and the benefits of antibiotic treatment outweigh the harms. This is because there is more documented experience of its use than for other macrolides.

- Based on evidence, their experience and resistance data, the committee agreed to recommend **co-amoxiclav** as the second-choice antibiotic for use only if symptoms get worse on a first-choice antibiotic taken for at least 2 to 3 days. People with suspected bacterial infection who do not respond to a first-choice antibiotic may be more likely to have an infection that is resistant to phenoxymethylpenicillin or a viral infection, and if their condition is worsening they should be reviewed. The dosage of 500/125 mg three times a day for adults (with corresponding usual doses in children) was used in studies in the evidence review and is appropriate for people in whom first-line treatment has failed.

## Antibiotic course length

- There was no significant difference in cure or improvement between a short course of antibiotic (3 to 7 days) and a long course (6 to 10 days). This was based on high quality evidence from 1 systematic review ([Falagas et al. 2009](#)). There was also no difference in cure or improvement in a subgroup analysis for treatment duration of 5 days compared with 10 days (high quality evidence) and in a subgroup of short course (3 to 7 days) compared with long course (6 to 10 days) of beta-lactam antibiotics (high quality evidence).
- There was no significant difference in adverse events between a short course of antibiotic (3 to 7 days) and a long course (6 to 10 days), based on high quality evidence from 1 systematic review in adults ([Falagas et al. 2009](#)). However, in sensitivity analyses, there were significantly fewer adverse events with a 5-day course compared with a 10-day course of antibiotics (moderate 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.
- Based on evidence, their experience and resistance data, the committee agreed that a 5-day course for all the recommended antibiotics was sufficient to treat acute sinusitis in adults and children. This takes into account the overall efficacy and safety evidence for antibiotics, and minimises the risk of resistance. Studies in the evidence review for specific antibiotics in acute sinusitis sometimes had longer course lengths than 5 days.

## Other considerations

### 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 (for example, nasal corticosteroids) (see the [NICE guideline on medicines adherence \[2009\]](#)).

### Resource implications

- Respiratory tract infections, including acute sinusitis, are a common reason for consultations in primary care, and therefore are a common reason for potential antibiotic prescribing. In a 2011 survey of UK primary care ([Gulliford et al. 2014](#)), consultations for sinusitis accounted for 9% of all consultations for respiratory tract infections, but the median practice issued an antibiotic prescription for 91% of these.
- There is potential for resource savings if a no antibiotic or a back-up antibiotic prescription is used. One open-label RCT ([de la Poza Abad et al. 2015](#)) found there were significantly lower rates of antibiotic collection with back-up (delayed) antibiotic prescriptions (either prescription collection [26%] or patient-led [34.7%]) compared with the immediate prescription group (89.1%,  $p < 0.001$ ; low quality evidence).
- Recommended high-dose nasal corticosteroids are available as generic and proprietary products and costs per unit (excluding VAT) range between £1.71 and £12.99 ([Drug Tariff](#), October 2017).
- Recommended antibiotics are all available as generic formulations, see Drug Tariff for costs

See the [full evidence review](#) for more information.

## Finding more information and committee details

To find NICE guidance on related topics, including guidance in development, see the [NICE topic pages on ear, nose and throat conditions](#) and [antimicrobial stewardship](#).

For full details of the evidence and the guideline committee's discussions, see the [evidence review](#). You can also find information about [how the guideline was developed](#), including [details of the committee](#).

NICE has produced [tools and resources to help you put this guideline into practice](#). For general help and advice on putting our guidelines into practice, see [resources to help you put NICE guidance into practice](#).

# Update information

## Minor changes since publication

**January 2022:** We made minor wording changes to reflect updated advice on the use of macrolides in pregnancy.

**May 2021:** In recommendation 1.1.8 we clarified that people who are at high risk of serious illness should be offered an immediate antibiotic.

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