ACE CLINICAL GUIDELINE

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Upper respiratory tract infections

Rational antimicrobial use

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Objective	Scope	Target audience
To guide appropriate antimicrobial use in the treatment of upper respiratory tract infections (URTIs)	Clinical assessment, diagnosis and management of URTIs, focusing on appropriate antimicrobial use where clinically indicated	This clinical guideline is relevant to all healthcare professionals caring for patients with URTIs, especially those providing primary care and generalist care

Overuse of antibiotics in primary care in Singapore is a common and significant problem, well recognised and acknowledged by most (82.7%) general practitioners surveyed.[1] Antibiotic overprescribing is especially common for upper respiratory tract infections (URTIs) in both adult and paediatric populations.

Antibiotics and antivirals are often not indicated for URTIs as these conditions are usually self-limiting, and most untreated patients (82%) are symptom free after one week.[2-5] As URTIs are one of the most common reasons for consultations in the primary care setting, this presents an opportunity for healthcare professionals to steward antimicrobial use through judicious prescribing and patient education. This ACE Clinical Guideline (ACG) provides guidance on appropriate antimicrobial use for treating URTIs in primary and generalist care settings, highlighting situations where antimicrobial therapy can be safely withheld, and other instances where timely administration of antimicrobial therapy may be beneficial.

Statement of Intent

This ACE Clinical Guideline (ACG) provides concise, evidence-based recommendations and serves as a common starting point nationally for clinical decision-making. It is underpinned by a wide array of considerations contextualised to Singapore, based on best available evidence at the time of development. The ACG is not exhaustive of the subject matter and does not replace clinical judgement. The recommendations in the ACG are not mandatory, and the responsibility for making decisions appropriate to the circumstances of the individual patient remains at all times with the healthcare professional.

ACE agency for care effectiveness

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Diagnosis and severity assessment

Recommendation 1 **Assess patients' clinical signs and symptoms and establish a working diagnosis (e.g. uncomplicated URTI, acute rhinosinusitis, pharyngotonsillitis, acute otitis media).**

A comprehensive assessment is essential to establish an accurate working diagnosis which will guide subsequent management decisions, including whether antimicrobials are needed.

Common diagnoses of URTIs

URTIs encompass many acute illnesses and are predominantly caused by viruses. Common URTI diagnoses include uncomplicated URTI, acute rhinosinusitis, pharyngotonsillitis, laryngitis and acute otitis media (AOM). While these conditions share many overlapping symptoms, each presents with distinct clinical characteristics. Figure 1 summarises the key features of common URTI diagnoses.

During the assessment of an URTI, clinicians should remain mindful of other potential differential diagnoses that may require different treatment approaches (see 'Differential diagnoses').

Differential diagnoses

- **Non-infectious aetiology:** allergic rhinitis, asthma, chronic obstructive pulmonary disease
- **Other infections:** pneumonia, pertussis, odontogenic infections, deep neck infections
- **Mimics of URTI:** scarlet fever, glandular fever,[6] agranulocytosis (e.g. in context of recent initiation of carbimazole, clozapine etc)

Refer to the ACGs on the following conditions for further details:

- Allergic rhinitis
- Asthma

Figure 1. Common URTI diagnoses – key characteristics and diagnostic criteria (where applicable)

Uncomplicated URTI

Characterised by symptoms including cough, rhinorrhoea, nasal congestion, and/or sore throat, which does not constitute an alternative URTI diagnosis.[7] Uncomplicated URTI also encompasses 'common cold' and 'influenza-like illness'.[a] See Recommendations 2 and 4 for further information.

Laryngitis

Characterised by acute onset of hoarseness, change in quality of voice or vocal strain. It may be accompanied by dry cough, and throat discomfort, pain or dryness.[9] Most cases of laryngitis resolve without the need for specific antimicrobial treatment.

Acute rhinosinusitis

Characterised by nasal congestion, nasal discharge and facial fullness. Diagnostic criteria as follows:[10,11]

Children

Sudden onset of symptoms lasting less than 12 weeks. Symptoms must include 2 or more of:

- Nasal blockage/congestion
- Discoloured nasal discharge (anterior/posterior)
- Cough (daytime and night-time)

Adults

Sudden onset of **at least 2** of the following symptoms lasting less than 4 weeks. Symptoms must include:

- Nasal blockage/congestion **AND/OR**
- Nasal discharge (anterior/posterior)

With or without:

- Facial pain, pressure, fullness
- Reduction/loss of smell

See Recommendation 3 for further information.

Pharyngotonsillitis

Characterised by symptoms including sore throat, redness of the tonsils/pharynx, and/or tonsillar exudate. It may be accompanied by fever, enlarged and tender cervical lymph nodes, dysphagia, and headache.[12] See Recommendation 3 for further information.

[a] Influenza-like illness refers to an acute respiratory infection with fever of ≥38°C, cough, and with onset within the last 10 days.[8]

Acute otitis media (AOM)

Characterised by infection of the middle ear, often presenting with symptoms of ear fullness, earache, or muffled hearing. Diagnostic criteria as follows:[13]

- Moderate to severe bulging of the tympanic membrane OR new onset of ear discharge not due to acute otitis externa, OR
- Mild bulging of the tympanic membrane AND recent (<48 hours) onset of ear pain (including holding, tugging, or rubbing of the ear in a nonverbal child) or intense redness of the tympanic membrane.

PRACTICE REMINDER

- Suspect AOM as a possible differential diagnosis in young children with fever who cannot accurately verbalise symptoms.[14] Perform otoscopy to confirm the diagnosis of AOM, where feasible.
- For adults presenting with AOM, given its rarity, maintain a high index of suspicion for other underlying disease (e.g. nasopharyngeal carcinoma). Monitor closely for resolution.

See Recommendation 3 for further information.

Red flags for possible serious conditions

Clinicians must maintain clinical vigilance to identify red flags and consider alternative serious diagnoses (e.g. epiglottitis, deep neck infections, meningitis) that may present with overlapping URTI-like symptoms. Where a more serious disease is suspected, a physical consultation is preferred to allow for a more thorough assessment. Figure 2 summarises some red flags which should prompt suspicion of more serious differential diagnoses, and consideration of care escalation.

Figure 2. Red flags and considerations for Emergency Department (ED) or ear, nose and throat (ENT) referral

Red flags in adults and children

ED referral is warranted[6,11,15,16]

- **Airway compromise** (e.g. stridor, drooling, muffled voice)
- **Respiratory distress** (e.g. severe dyspnoea, desaturation, tachypnoea)
- **Circulatory compromise** (e.g. hypotension, tachycardia disproportionate to fever, dehydrated yet unable to intake adequate fluids)
- **Systemic deterioration** (e.g. acute confusion/delirium, progressive/non-resolving symptoms in immunocompromised patients or patients at extremes of age)
- **Serious illness/complications** (e.g. meningism, dysphagia, neck swelling/pain, periorbital swelling/cellulitis, peritonsillar/retropharyngeal abscess, Lemierre syndrome)

ENT referral may be warranted[6,11,15,16]

- Persistent sore throat (>6 weeks)
- Persistent symptoms following recent ingestion of a foreign body (e.g. fish bone)
- Recurrent acute tonsillitis (>6 times/year)
- Signs suggestive of neoplasm of ear, nose, or throat origin (e.g. enlarged cervical lymph nodes, middle ear effusion, strong family history of ENT cancers)
- Rhinosinusitis lasting >12 weeks
- Recurrent AOM (>3 episodes within six months, or 4 episodes within one year with one episode in the preceding 6 months)

Additional red flags in children

ED referral is warranted[17]

- **Airway compromise** (e.g. stridor at rest, drooling, inability to swallow)
- **Respiratory distress** (e.g. grunting, severe work of breathing, tachypnoea beyond upper limit of normal for age, nasal flaring, use of accessory muscles for breathing)
- **Circulatory compromise** (e.g. pale/mottled/ashen/blue skin, lips, or tongue, reduced skin turgor, persistent tachycardia, sunken fontanelles in infants)
- **Systemic deterioration** (e.g. difficult to rouse, lethargy, reduced activity/play, not responding to social cues, altered consciousness, poor feeding, weak/high-pitched/continuous cry)
- **Serious illness/complications** (e.g. bulging fontanelles)

Consideration of antibiotics for URTI management

Recommendation 2 **Do not prescribe antibiotics for patients with uncomplicated URTI.**

The potential harms of antibiotic use for uncomplicated URTIs generally outweigh the limited benefits. Severe or suppurative complications arising from uncomplicated URTIs are rare,[5] and the clinical benefits of antibiotic therapy remains uncertain (in the absence of risk factors or complications), as most patients recover at a similar rate regardless of whether antibiotics are used.[5,18,19]

Antibiotic exposure substantially increases the risk of antimicrobial resistance. Amongst primary care patients, the odds of developing resistance to an antibiotic are two times higher for a patient who received a course of antibiotic compared to a patient who did not, and these odds increase with longer treatment duration or repeated courses.[20]

Adverse effects are common with antibiotic use, with an estimated 1 in 10 patients experiencing symptoms such as nausea, vomiting, or diarrhoea.[18] Less frequently, antibiotic use can result in *Clostridioides difficile* colitis, which carries significant morbidity.[21,22]

When there is poor patient knowledge and misperceptions about antibiotic use, patients may expect clinicians to prescribe antibiotics even when it is unnecessary;[23–25] this has been shown to influence antibiotic prescribing practices.[24] As such, it is important for clinicians to exercise their clinical judgement to determine when antibiotics are truly indicated. As uncomplicated URTIs are common presentations and self-limiting, URTI consultations present valuable opportunities for patient education about unnecessary antibiotic use and its associated harms.

PATIENT EDUCATION

Manage patient's expectations for antibiotics

- Highlight the **limited benefits of antibiotics** in uncomplicated URTI, the **risk of antimicrobial resistance** and **adverse effects** associated with antibiotics use.
- Explain the **expected symptom duration of URTI**. While many symptoms may resolve within a week, some symptoms (e.g. cough) may continue for an extended period (Figure 3).

Scan or click the QR code for more patient education materials on responsible use of antibiotics.

Consume antibiotics responsibly

Figure 3. Duration of common URTI symptoms

Duration of URTI symptoms

For adults

URTI episodes last 8 days on average.[26] However, specific symptoms can vary considerably in duration.

For patients with:

Cough – 20-73% recover within 8 days, but on average, cough lasts 17.8 days, with some lasting up to 29 days (~4 weeks).[27]

Sore throat – 82% recover within 7 days.[5]

Runny nose – 46% recover within 7 days and 64% within 14 days,[28] with some lasting 17-19 days or longer.[29]

For children[30]

URTI episodes last 7-15 days on average, with 50% of the population recovering by day 10. Specific symptoms vary in duration.

For patients with:

Cough – 50% recover within 10 days and 90% within 25 days

Sore throat – 63-66% recover within 3 days, with some lasting up to 7 days or longer

Fever – 72% recover within 3 days, and 28% persist beyond 3 days

Earache – 50% recover within 3 days and 90% within 7 to 8 days

Symptomatic management of uncomplicated URTI

Recognising that antibiotics have minimal to no effect on symptomatic relief (e.g. cough),[31,32] symptomatic medications are commonly prescribed to manage the symptoms of URTIs. While numerous symptomatic medications are available and marketed for this purpose, the evidence supporting the efficacy of most of these medications remains uncertain.[15,33-41] This may be due to the self-limiting nature and short duration of URTIs, which can make it challenging to detect significant differences in outcomes.

Some preparations that may be effective include:

- Echinacea – may help shorten URTI duration (effects may vary between preparations);[42] not routinely recommended in children
- Honey – may help with cough frequency and severity; contraindicated in children <1 year (due to risk of infant botulism)[43]
- Intranasal mometasone or saline irrigation – may help with management of nasal blockage/congestion in post-acute rhinosinusitis (i.e. when rhinosinusitis symptoms persist >10 days).[11] The use of intranasal steroid in children are usually restricted to those age ≥2 years old (depending on product).

If prescribing symptomatic medications, be mindful of their associated precautions. For example:[b]

- Avoid medications that are contraindicated or unsuitable for the paediatric population.
  - Mucolytics should be avoided in children <2 years old due to choking risk related to inability to expectorate loose phlegm.
  - Promethazine is contraindicated for children <2 years old due to risk of respiratory depression.
  - Codeine-containing cough preparations are contraindicated in children <12 years old.
  - Oral decongestants (e.g. pseudoephedrine or phenylephrine) should be avoided in children <2 years old and used with caution in children 2-12 years old (depending on product), due to adverse drug reactions (e.g. tachycardia, palpitation, hypertension).
- Exercise caution when prescribing multiple antihistamines concurrently (e.g. prescribing promethazine or diphenhydramine cough syrup with another first- or second-generation oral antihistamine), or when prescribing sedating antihistamines in the elderly population due to risk of falls.
- Choose an alternative medication if there is a significant risk of medication interaction (e.g. dextromethorphan with alcohol, sleeping pills, anxiolytics) or adverse drug reaction (e.g. acute retention of urine with codeine-containing cough suppressant).

PRACTICE REMINDER

- **Exercise caution when considering symptomatic medications**, especially for paediatric and vulnerable populations, and counsel the patient or their carer accordingly.
- **Advise patients to return for reassessment** if there is uncertainty in clinical diagnosis, or if symptoms worsen rapidly or significantly.

PATIENT EDUCATION

Ensure patients understand the importance of keeping up to date with recommended vaccinations

- Advise patients to receive all **age-appropriate vaccinations** to protect against specific diseases as recommended in the National Childhood Immunisation Schedule (NCIS) and National Adult Immunisation Schedule (NAIS).
- COVID-19 vaccination is also recommended for individuals aged 60 and above, medically vulnerable individuals aged 6 months and above, and residents of aged care facilities.

Scan or click the QR code for more information on COVID-19 vaccination, NCIS and NAIS

NCIS and NAIS | *COVID-19 vaccination*

Remind patients to practice good hand hygiene and respiratory etiquette, especially during acute illness

- Encourage good hand hygiene through regular **handwashing with soap or hand sanitisation**.
- Encourage the use of **masks** that cover both their mouth and nose completely to prevent the spread of germs when they are symptomatic.

[b] Examples are non-exhaustive. Information from local product information leaflet/product insert have been referenced and supplemented with information from consolidated product monographs (e.g. Lexicomp) and expert consensus where local product inserts are unavailable or unclear. Refer to local product inserts for full details before prescribing.

Recommendation 3

For patients with acute rhinosinusitis, pharyngotonsillitis or acute otitis media: When a bacterial infection is clinically suspected, consider if an antibiotic is needed based on clinical features and individual risk factors for severe disease outcome.

To decide whether an antibiotic is clinically warranted for the treatment of acute rhinosinusitis, pharyngotonsillitis or AOM:

- Assess if the patient's presenting clinical signs and symptoms point towards a significant bacterial infection (Figure 4). Patients with signs and symptoms suggestive of a significant bacterial infection are likely to benefit from antibiotic therapy.
- Consider if the patient has risk factors which increases their likelihood of severe disease and exercise clinical judgement to decide if the patient's risk factors warrant lowering the treatment threshold for initiating antibiotics. Risk factors which increase the likelihood of severe disease include:[6,10,15,44-50]
  - Older age (>65 years)
  - Immunocompromised status
  - Chronic pulmonary disease
  - Cardiovascular disease
  - Chronic kidney disease
  - Chronic metabolic disease (including diabetes mellitus)
  - Presence of upper airway structural abnormalities/variants (e.g. in children with congenital diseases like Down syndrome)

Figure 4. Clinical features suggesting significant bacterial infections

Acute rhinosinusitis

Significant bacterial infection should be suspected in the following situations:

- Symptoms persist and show no improvement after 7 days, or worsen[10]
- Symptoms worsen after initial improvement ('double sickening')[10,11]
- Severe symptoms (e.g. high fever >39°C, facial pain, or purulent nasal discharge) last 3-4 days[51]
- An odontogenic source of infection is suspected[10]
- There are concerns of complications (orbital, intracranial or osseous involvement)[10]

Pharyngotonsillitis

Significant bacterial infection should be suspected when patients present with:

- Modified Centor/McIsaac score of ≥3[6,51 c]

Modified Centor scoring[52]

+1	Age 3-14 years
-1	Age ≥45 years
+1	Exudate or swelling on tonsils
+1	Tender/swollen anterior cervical lymph nodes
+1	Temperature >38°C
+1	Cough **absent**

Modified Centor interpretation[53]

Score	Probability of Streptococcal pharyngitis
0	1-8%
1	5-14%
2	11-23%
3	28-37%
≥4	51-55%

Acute otitis media (AOM)

Significant bacterial infection should be suspected in:

- Adults with AOM
- Children under 2 years with infection in both ears[45]
- Children of any age with otorrhoea (discharge following perforation of the eardrum)[45]
- Children with symptoms which significantly worsen or do not start to improve within 3 days, or if symptoms worsen rapidly or significantly at any time[45]

PRACTICE REMINDER

Consider lowering treatment threshold if additional risk factors are present, including presence of a cochlear implant or AOM in only hearing ear.

[c] Where rapid antigen detection test (RADT) or throat culture is available and feasible, consider testing for group A Streptococcus (GAS) in patients with a Modified Centor score of ≥3 to support the diagnosis of GAS pharyngitis and treatment decisions.

Selecting appropriate antibiotics

If the decision is made to start antibiotics for a patient with a suspected bacterial infection:

1. Consider the **underlying URTI condition** for which antibiotics are prescribed (e.g. acute rhinosinusitis, pharyngotonsillitis, acute otitis media)
2. Identify any **risk factors** which may suggest resistant organisms, such as recent hospitalisation
3. Evaluate the suitability of antibiotic choice for the **individual patient** (e.g. medication allergies, likelihood of adverse effects)
4. Select the **narrowest spectrum antibiotic**[d] for the **shortest effective course** at an appropriate dose[54] (refer to Supplement 1 on page 9)

Patient-reported drug allergies are common in clinical practice and it has been reported that most self-reported drug allergies are inaccurate.[55,56] Similarly, patients with documented or reported penicillin allergy may not have true penicillin allergy and it is advisable to verify the penicillin allergy (e.g. clarify characteristics of past reactions and review documented medication history to check if the patient has previously tolerated penicillin).

PATIENT EDUCATION

Promote correct antibiotic use

- If antibiotics are prescribed, advise patients to **complete the course** of antibiotics.
- Remind patients **not to keep antibiotics for future illnesses** and **not to self-medicate** with antibiotics, even if it was previously prescribed for the same person or for a similar reason, unless instructed by the clinician.

Scan or click the QR code to access patient counselling resources on responsible antibiotics use.

Consume antibiotics responsibly

Dispensing antibiotics only when they are immediately required

To prevent unnecessary antibiotic use, consider delaying the dispensing of antibiotics if they are not deemed to be required immediately, for example by:[32,45,57,58]

- Issuing an antibiotic prescription at the initial visit but with delayed dispensing instructions
- Advising the patient to recontact the clinic to request for antibiotics at a later day

Clear guidance must be provided to patients on when to have the prescription dispensed, or when to recontact the clinic to request for antibiotics (e.g. symptoms worsen or fail to improve after 3-5 days) and when to return for review (e.g. development of new symptoms or red flags, persistent fever).[45,58,59]

The practice of dispensing antibiotics at the initial visit with instructions for delayed use is best reserved for circumstances where delayed dispensing of antibiotics is not feasible. While this practice facilitates timely treatment if a patient's condition worsens, its impact on inappropriate or unnecessary antibiotic use is unknown. There is a risk that the dispensed antibiotics may be used before clinically indicated. Unused antibiotics pose an unnecessary expense to the patient and may inadvertently encourage future self-medication.

[d] In line with the World Health Organization's AWaRe classification (Access, Watch and Reserve); antibiotics in the 'Access' category generally have a lower resistance potential than the 'Watch' and 'Reserve' categories.[54]

Antivirals in URTI management

Recommendation 4 **Do not routinely prescribe antivirals for otherwise healthy patients with uncomplicated URTI.**

Uncomplicated URTIs are predominantly caused by viruses which include rhinovirus, adenovirus, non-severe acute respiratory syndrome (non-SARS) seasonal coronavirus, and respiratory syncytial virus; most uncomplicated URTIs are not caused by influenza virus or COVID-19 (SARS-CoV2) virus.[7,60,61] Even when they are, most conditions would be self-limiting without the need for antivirals, especially for patients who are otherwise healthy.

For influenza, baloxavir and oseltamivir are the more commonly used antivirals for mild-to-moderate influenza[e] locally. However, baloxavir and oseltamivir only provide modest benefits in faster symptom resolution, by approximately 24 hours and 18 hours respectively, with no impact on hospitalisation rates and mortality.[50,63] Treatment with antivirals may also result in adverse effects, commonly gastrointestinal disturbances (e.g. nausea and vomiting).[50,64,65]

For COVID-19, nirmatrelvir + ritonavir is available locally for mild-to-moderate COVID-19. However, its use should be limited to patients who are at high risk of progressing to severe COVID-19. For patients at low risk of developing severe disease, the risk of potential adverse effects, medication interactions and associated treatment cost outweigh the potential benefits of treatment with nirmatrelvir + ritonavir.[66] When indicated for patients at high risk of developing severe disease, treatment should begin as early as possible and within five days of symptom onset. When prescribing nirmatrelvir + ritonavir, counsel the patient on the potential adverse effects (of which altered taste and diarrhoea are commonly described), potential drug-drug interactions and associated treatment cost. For more information on COVID-19 treatment and nirmatrelvir + ritonavir use, refer to COVID-19 - National Centre for Infectious Diseases.

PRACTICE REMINDER

For patients with risk factors for severe disease:[f]

- **Weigh the potential benefits and harms** and engage in shared decision-making with patients.
- Antiviral treatment may be considered in high-risk individuals (e.g. immunocompromised patients) or those with severe symptoms.[g] The decision to treat should ideally be guided by diagnostic test [RADT[h] or polymerase chain reaction (PCR) test]. If testing is unavailable, treatment of high-risk individuals with suspected influenza may be considered on a case-by-case basis.
- Post-exposure antiviral prophylaxis for influenza may be considered in high-risk individuals with confirmed exposure (i.e. where close contact has tested positive for influenza).[67]

[e] Mild-to-moderate influenza is defined as influenza without severe illness or syndrome [e.g. sepsis, septic shock, severe pneumonia, acute respiratory distress syndrome (ARDS), multi-organ failure] or mortality.[62]

[f] For risk factors for severe influenza, see risk factors in Recommendation 3. For risk factors for severe COVID-19, refer to Annex A of MOH Circular 67/2025.

[g] Refer to MOH Drug Advisory Committee Technology Guidance for Medication Assistance Fund (MAF) clinical criteria for nirmatrelvir + ritonavir.

[h] Interpret results based on the sensitivity and specificity of individual RADT kits, as marked variation may be present across kits.

Supplement 1. Antibiotic choices for confirmed or suspected bacterial URTIs – acute rhinosinusitis, pharyngotonsillitis, and acute otitis media*

Bacterial acute rhinosinusitis

	Adult	Paediatric
First line	**Amoxicillin**, 500-1000 mg, TDS, for 5-7 days	**Amoxicillin**, 30 mg/kg/dose, TDS, for 10-14 days (Maximum dose: 1000 mg/dose)
Alternative	**Amoxicillin + clavulanic acid**, 500 + 125 mg, TDS, for 5-7 days OR **Amoxicillin + clavulanic acid**, 875 + 125 mg, BD, for 5-7 days If allergic to penicillin or beta-lactam: **Azithromycin**, 500 mg, OD, for 3 days† OR **Clarithromycin**: 500 mg, BD, for 5-7 days†	**Amoxicillin** (600 mg/5 mL) **+ clavulanic acid** (42.9 mg/5 mL), (14:1 formulation), 45 mg/kg/dose (amoxicillin component), BD, for 10-14 days‡ [Maximum dose (amoxicillin component): 1800 mg/dose] (To target 90 mg/kg/**day** of amoxicillin component) If allergic to penicillin or beta-lactam: **Azithromycin**, 10 mg/kg/dose, OD, for 3 days† (Maximum dose: 500 mg/dose) OR **Clarithromycin,** 7.5 mg/kg/dose, BD, for 5-7 days† (Maximum dose: 500 mg/dose)

Bacterial pharyngotonsillitis

	Adult	Paediatric
First line	**Amoxicillin**, 500 mg, TDS, for 10 days	**Amoxicillin**, 25 mg/kg/dose, BD-TDS, for 10 days (Maximum dose: 500 mg/dose)
Alternative	**Amoxicillin + clavulanic acid**, 500 + 125 mg, TDS, for 10 days OR **Amoxicillin + clavulanic acid**, 875 + 125 mg, BD, for 10 days If allergic to penicillin or beta-lactam: **Azithromycin**, 500 mg, OD, for 3 days† OR **Clarithromycin**, 500 mg, BD, for 10 days† OR **Clindamycin**, 300-450 mg, TDS, for 10 days§	**Amoxicillin** (200 mg/5 mL) **+ clavulanic acid** (28.5 mg/5 mL), (7:1 formulation), 25 mg/kg/dose (amoxicillin component), BD-TDS, for 10 days‡ [Maximum dose (amoxicillin component): 500 mg/dose] If allergic to penicillin or beta-lactam: **Azithromycin**, 10 mg/kg/dose, OD, for 3 days† (Maximum dose: 500 mg/dose) OR **Clarithromycin**, 7.5 mg/kg/dose, BD, for 10 days† (Maximum dose: 500 mg/dose) OR **Clindamycin**, 10 mg/kg/dose, TDS, for 10 days§ (Maximum dose: 450 mg/dose)

Bacterial acute otitis media (AOM)

	Adult	Paediatric
First line	**Amoxicillin**, 1000 mg, TDS, for 5-7 days	**Amoxicillin**, 30 mg/kg/dose, TDS, for 5-7 days (Maximum dose: 1000 mg/dose) For children <2 years old, extend duration to 10 days
Alternative	**Amoxicillin + clavulanic acid,** 500 + 125 mg, TDS, 5-7 days OR **Amoxicillin + clavulanic acid**, 875 + 125 mg, BD, for 5-7 days If allergic to penicillin or beta-lactam: **Azithromycin,** 500 mg, OD, for 3 days† OR **Clarithromycin**, 500 mg, BD, for 5-7 days†	**Amoxicillin** (600mg/5 mL) **+ clavulanic acid** (42.9 mg/5 mL), (14:1 formulation), 45 mg/kg/dose (amoxicillin component), BD for 5-7 days‡ [Maximum dose (amoxicillin component): 1800 mg/dose] (To target 90 mg/kg/**day** of amoxicillin component) If allergic to penicillin or beta-lactam: **Azithromycin**, 10 mg/kg/dose, OD, for 3 days† (Maximum dose: 500 mg/dose) OR **Clarithromycin** 7.5 mg/kg/dose, BD, for 5-7 days† (Maximum dose: 500 mg/dose)

BD, two times a day; OD, once a day; TDS, three times a day

*Medications listed are currently registered and available on government subsidy list at time of publication (refer to MOH website for more information). Dosing information is based on information from local product information leaflet, international literature, guidelines[58,59,68-71] and expert opinion.

†Macrolides are associated with increasing resistance locally; clinicians should monitor for treatment response.

‡An alternative formulation of amoxicillin + clavulanic acid is available locally and is acceptable when dosed appropriately to achieve therapeutic levels.

§Clindamycin lacks efficacy against *H. influenzae*.

References

Click or scan the QR code for the reference list to this clinical guideline

Evidence-to-Recommendation Framework

Click or scan the QR code to view the rationale underpinning the recommendations in this clinical guideline

Google Gemini was used to portray a cross-section of the upper respiratory tract with potential areas of inflammation during an upper respiratory tract infection. (Google Gemini, accessed, March 2026)

Expert group

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For more information on the Expert Group composition and other details, click here.

About the Agency

The Agency for Care Effectiveness (ACE) was established by the Ministry of Health (Singapore) to drive better decision-making in healthcare by conducting health technology assessments (HTA), publishing healthcare guidelines and providing education. ACE develops ACE Clinical Guidelines (ACGs) to inform specific areas of clinical practice. ACGs are usually reviewed around five years after publication, or earlier, if new evidence emerges that requires substantive changes to the recommendations. To access this ACG online, along with other ACGs published to date, please visit www.ace-hta.gov.sg/healthcare-professionals/ace-repository-for-clinical-guidelines/

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