

Quiz Feedback

Rational Use of Antibiotics in Respiratory Tract Infections



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Feedback

We are sorry you did not return a quiz to us.

The responses that we received generally represented good clinical practice, despite some difficulty in getting a clinical feel in these limited short scenarios. However we are aware that the way people respond to these quizzes does not always represent how they act in the consulting room. If these quiz answers could be translated into actual practice we are likely to benefit from reduced development of organisms resistant to second line agents, reduced national prescribing costs, and reduced adverse effects to antibiotics without compromising patient care.

It is pleasing to see that nearly every respondent chose to not prescribe an antibiotic for the boy with a common cold.

We have tried to dissuade people from using amoxicillin-clavulanate as a first-line antibiotic in respiratory infections. Amoxicillin is a better first choice in most situations and amoxicillin-clavulanate is better reserved for those situations when it is specifically indicated.

High-dose amoxicillin may be needed, particularly for otitis media, if you have a high incidence of non-susceptible *S. pneumoniae* in your community or the patient attends pre-school or has recently had antibiotics. High-dose amoxicillin means using 80 – 90 mg/kg/day in two or three divided doses rather than the usual 50 mg/kg/day.

Thank you to all those people who write, fax or email us with comments, questions or complaints. You are helping to keep us on our toes and our resources relevant.

Please let us know if there is any way we can make our case studies more useful to you. We want our resources to be helpful with your day-to-day clinical practice. We would be pleased to receive any suggestions that you have.

If you have any questions please email these to us and we will answer via the 'Your Questions Answered' section of our web site.

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Key Points

Rational Use of Antibiotics in Respiratory Tract Infections

“The prevalence of antibiotic resistance in a country reflects the local consumption of antibiotics. The majority of antibiotics are prescribed in general practice and most prescriptions are attributable to treatment of respiratory tract infections.” (Bjerrum, 2004).

General principles of rational antibiotic use

- Avoid prescribing antibiotics for viral infections.
- When antibiotics are indicated, choose the appropriate dose and duration of an effective agent with the narrowest spectrum, fewest side effects and lowest cost.

Application of these principles to the treatment of respiratory tract infections would result in no prescribing of antibiotics for viral infections such as the common cold and a selection between penicillin V, amoxicillin or erythromycin as first line therapy for most bacterial respiratory infections. This would reduce the development of organisms resistant to second line agents, reduce national prescribing costs, and reduce adverse effects to antibiotics without compromising patient care.

New Zealand general practitioners have done well in moving toward more rational antibiotic use. Rational use of antibiotics reduces resistance rates for the community as a whole (Molstad, 1999, Hefferman, 2002). It also importantly reduces the likelihood of individuals developing resistant bacteria. People who take antibiotics have increased risk of developing resistant strains of bacteria, for example a resistant strain of pneumococcus in their nasopharynx.

The situation here in New Zealand is unlike an American study, which reported that 46% of patients presenting to doctors with the common cold were prescribed antibiotics for this viral infection. Worse, 51% of the antibiotics used were broad-spectrum (Steinman, 2003). Never the less, there were three quarters of a million prescriptions for amoxicillin-clavulanate (Augmentin®) in New Zealand in 2005 (Pharmhouse data).

Even when antibiotics are indicated, the use of broad-spectrum antibiotics such as amoxicillin-clavulanate, second generation macrolides, cephalosporins and quinolones as first line therapy for respiratory tract infections encourages the development of resistant strains and substantially adds to costs.

When a person takes an antibiotic to treat an illness, the drug kills susceptible bacteria. This leaves bacteria that can resist it - resistant bacteria. With the reduced competition, resistant bacteria can increase their numbers exponentially, to become predominant. Broad-spectrum antibiotics kill a wide-range of bacteria allowing resistant strains which were previously an insignificant minority to predominate.

Respiratory Tract Infections

1. An eight year-old boy has had a non-specific upper respiratory infection with cough for five days. He has had four similar episodes this year. There is nothing of note in his past medical history and examination is normal apart from green mucopurulent discharge blocking his nose. He has no allergies. Which of the following antibiotics would you prescribe?
- Amoxicillin Amoxicillin-Clavulanate
 Erythromycin Penicillin V
 No antibiotic
2. A 17 year-old student has an upper respiratory infection with nasal discharge and quite severe pain over her maxillary sinuses. It started five days ago and does not seem to be improving. Her temperature is 39.1°C, She has no allergies. Which of the following antibiotics would you prescribe?
- Amoxicillin Amoxicillin-Clavulanate
 Erythromycin Penicillin V
 No antibiotic
3. An 18 year-old retail assistant presents with four days of sore throat and fever. She feels unwell but does not want to take time off work. Her temperature is 38°C she has an exudative pharyngitis and enlarged cervical nodes. She has no allergies or risk factors. Which of the following antibiotics would you prescribe?
- Amoxicillin Amoxicillin-Clavulanate
 Erythromycin Penicillin V
 No antibiotic
4. A five year-old boy has had a non-specific upper respiratory infection for four days and now has earache on the left side. On examination his temperature is 37.5°C. He has nasal congestion and his left ear drum is red. He has had two previous episodes of acute otitis media. He has no allergies or risk factors. Which of the following antibiotics would you prescribe?
- Amoxicillin Amoxicillin-Clavulanate
 Erythromycin Penicillin V
 No antibiotic
5. A six year-old girl has deafness in her right ear since an episode of acute otitis media six weeks ago. Her right tympanic membrane is yellowish in colour and has reduced mobility. The left ear is normal. She has no allergies or risk factors. Which of the following antibiotics would you prescribe?
- Amoxicillin Amoxicillin-Clavulanate
 Erythromycin Penicillin V
 No antibiotic
6. A previously well 30 year-old office worker has had cough productive of green sputum for the last seven days. He came today because he felt short of breath when he played his weekly game of squash. His chest reveals scattered wheezing and his temperature is 37.7°C. He has no allergies or risk factors. Which of the following antibiotics would you prescribe?
- Amoxicillin Amoxicillin-Clavulanate
 Erythromycin Penicillin V
 No antibiotic
7. A previously well 42 year-old mother of three children is unwell with cough, sweating, and muscular aches and pains. Her temperature is 38.7°C, respiratory rate 20 breaths per minute and BP 124/82. Her thinking is clear. She has moist sounds and wheeze in the right midzone of her chest. She has no allergies or risk factors. Which of the following antibiotics would you prescribe?
- Amoxicillin Amoxicillin-Clavulanate
 Erythromycin Penicillin V
 No antibiotic
8. A four year-old girl has had a cough for three days. Her respiratory rate is 47 breaths per minute and she has mild chest indrawing. She has had no recent illnesses and no history of wheeze. She does not look toxic and is drinking well. Chest examination is normal. She has no allergies or risk factors. Which of the following antibiotics would you prescribe?
- Amoxicillin Amoxicillin-Clavulanate
 Erythromycin Penicillin V
 No antibiotic

Feedback

From the GP Panel and Commentary from Professor Bruce Arroll

1. **An eight year-old boy has had a non-specific upper respiratory infection with cough for five days. He has had four similar episodes this year. There is nothing of note in his past medical history and examination is normal apart from green mucopurulent discharge blocking his nose. He has no allergies. Which of the following antibiotics would you prescribe?**

	You	Your Peers	GP Panel
Amoxicillin		3 %	
Amoxicillin-Clavulanate		<1 %	
Erythromycin		<1 %	
Penicillin V		<1%	
No antibiotic		96 %	+

2. **A 17 year-old student has an upper respiratory infection with nasal discharge and quite severe pain over her maxillary sinuses. It started five days ago and does not seem to be improving. Her temperature is 39.1°C, She has no allergies. Which of the following antibiotics would you prescribe?**

	You	Your Peers	GP Panel
Amoxicillin		83 %	+
Amoxicillin-Clavulanate		10 %	
Erythromycin		<1 %	
Penicillin V		<1 %	
No antibiotic		5 %	

GP Panel: Almost all respondents and the GP panel would not prescribe antibiotics for this boy with the common cold. The panel felt that the general public were getting the message about the lack of benefit of antibiotics for viral infections. Panel members are under less pressure to prescribe them than they used to be.

Expert commentary: There is no indication for antibiotics in this situation. There is little that can be done for cough although there is a small amount of evidence that the older sedating antihistamine-decongestant combinations may have some benefit.

GP Panel: The panel felt a choice of amoxicillin is fairly clear-cut for this woman with signs suggestive of bacterial sinusitis. There was some concern about her high temperature that would prompt some panel members to search for contributory problems.

The panel would give her a timeframe for improvement with advice to return if the pain did not respond as expected.

Expert commentary: This patient meets the criteria for bacterial sinusitis which is either persistent or severe symptoms i.e. temp >39°C lasting for 3-4 consecutive days. The American Pediatric Association guideline only recommends amoxicillin-clavulanate in situations where the patient has been on amoxicillin recently or is in day care. In the most recent randomised trial with amoxicillin-clavulanate (Bucher, 2003) this drug made no difference in outcome even though the patients had rhoscopically diagnosed bacterial sinusitis. If the patient was not getting better on amoxicillin then amoxicillin-clavulanate would be indicated.

3. **An 18 year-old retail assistant presents with four days of sore throat and fever. She feels unwell but does not want to take time off work. Her temperature is 38°C she has an exudative pharyngitis and enlarged cervical nodes. She has no allergies or risk factors. Which of the following antibiotics would you prescribe?**

	You	Your Peers	GP Panel
Amoxicillin		4 %	
Amoxicillin-Clavulanate		<1 %	
Erythromycin		2 %	
Penicillin V		81 %	+/-
No antibiotic		12 %	+

4. **A five year-old boy has had a non-specific upper respiratory infection for four days and now has earache on the left side. On examination his temperature is 37.5°C. He has nasal congestion and his left ear drum is red. He has had two previous episodes of acute otitis media. He has no allergies or risk factors. Which of the following antibiotics would you prescribe?**

	You	Your Peers	GP Panel
Amoxicillin		37 %	
Amoxicillin-Clavulanate		2 %	
Erythromycin		<1 %	
Penicillin V		<1 %	
No antibiotic		60 %	+

GP Panel: The panel felt this woman could have either a viral or streptococcal sore throat. They thought a back pocket prescription combined with a throat swab would be a useful strategy.

Expert commentary: We need more information to know the probability of streptococcal tonsillitis i.e were her neck glands tender. If so her probability of a positive tonsillar swab would be 27-28% (based on Canadian data) (McIsaac, 1998). If she was from a lower socioeconomic group and in the North Island or of Māori or Pacific ethnicity then either a throat swab (and treat on results) or treatment would be indicated as a means of preventing rheumatic fever. In that case twice daily penicillin or once daily amoxicillin would be indicated. (This is the advice of the latest National Heart Foundation guidelines which are in press).

GP Panel: The panel would encourage this boy's parent not to use antibiotics, as there is unlikely to be significant benefit. However if the parents were keen to use antibiotics the panel would be relaxed about doing so and would prescribe amoxicillin. They may well offer a back pocket prescription.

Expert commentary: I agree. Most modern guidelines only suggest initial treatment for children under the age of 6 months. The previous two episodes probably do not warrant any other action. It is unusual for a five year old to be getting otitis media and looking for other causes such as smoke exposure would be indicated.

5. A six year-old girl has deafness in her right ear since an episode of acute otitis media six weeks ago. Her right tympanic membrane is yellowish in colour and has reduced mobility. The left ear is normal. She has no allergies or risk factors. Which of the following antibiotics would you prescribe?

	You	Your Peers	GP Panel
Amoxicillin		6 %	
Amoxicillin-Clavulanate		1 %	
Erythromycin		1 %	
Penicillin V		<1 %	
No antibiotic		92 %	+

6. A previously well 30 year-old office worker has had cough productive of green sputum for the last seven days. He came today because he felt short of breath when he played his weekly game of squash. His chest reveals scattered wheezing and his temperature is 37.7°C. He has no allergies or risk factors. Which of the following antibiotics would you prescribe?

	You	Your Peers	GP Panel
Amoxicillin		26 %	
Amoxicillin-Clavulanate		3 %	
Erythromycin		7 %	
Penicillin V		0 %	
No antibiotic		63 %	+/-

GP Panel: The panel would enquire about hearing concerns. Hopefully the normal left ear would allow adequate hearing. Six weeks is not long enough to allow effusion following otitis media to resolve. Watching and waiting for a further six weeks or longer is an appropriate option.

There is unlikely to be any benefit in using antibiotics in this situation. A smoke free environment will reduce the likelihood of persistent middle ear effusion.

Expert commentary: I agree with this action.

GP Panel: The distribution of responses for this question reflected the difficulty the panel had with it. It was written to represent a man with viral bronchitis however some of the panel had concerns. They might be tempted to prescribe antibiotics because after seven days patients are getting to the time limit they consider appropriate for viral infections and GPs may find it difficult to exclude atypical pneumonia. The final decision would depend on the patient's wishes and individual circumstances.

Expert commentary: More information is needed on this man. Does he or his family have a history of atopy. We assume he is not a smoker. If one is concerned about "atypical pneumonia" or even typical pneumonia then a chest xray is indicated (in many jurisdictions this is available in New Zealand). At his age I would be surprised if he had pneumonia and the most likely diagnosis is bronchospasm either virally induced or due to underlying asthma. I am pleased the label "acute bacterial bronchitis" was not used as I am in the school of thought that this condition does not exist but is explained (in the randomised trials) by groups of patients with pneumonia, asthma, common cold and COPD (Arroll, 2001). In the Cochrane review (on antibiotics for acute bronchitis) the only subgroup to benefit from antibiotics for "acute bronchitis" was those who were over 55 years of age which is consistent with pneumonia/exacerbation of COPD.

7. A previously well 42 year-old mother of three children is unwell with cough, sweating, and muscular aches and pains. Her temperature is 38.7°C, respiratory rate 20 breaths per minute and BP 124/82. Her thinking is clear. She has moist sounds and wheeze in the right midzone of her chest. She has no allergies or risk factors. Which of the following antibiotics would you prescribe?

	You	Your Peers	GP Panel
Amoxicillin		79 %	+
Amoxicillin-Clavulanate		11 %	
Erythromycin		5 %	
Penicillin V		1 %	
No antibiotic		4 %	

8. A four year-old girl has had a cough for three days. Her respiratory rate is 47 breaths per minute and she has mild chest indrawing. She has had no recent illnesses and no history of wheeze. She does not look toxic and is drinking well. Chest examination is normal. She has no allergies or risk factors. Which of the following antibiotics would you prescribe?

	You	Your Peers	GP Panel
Amoxicillin		57 %	+/-
Amoxicillin-Clavulanate		2 %	
Erythromycin		1 %	
Penicillin V		<1 %	
No antibiotic		40 %	

GP Panel: Most respondents would prescribe amoxicillin for this woman's community acquired pneumonia. The panel would like to know she had adequate social support before treating her at home. She does not need an x-ray.

Expert commentary: I agree the evidence is that amoxicillin is as good as the others. The only advantage of erythromycin would be if she had legionella (which is not responsive to penicillins) and there is currently legionella in Auckland and Christchurch. The diagnosis is fairly clear but I think an xray after (> 6 weeks later) the episode would be a useful idea in case she had some underlying cause such as a malignancy or bronchiectasis.

GP Panel: This question was written to stress the importance of tachypnoea and chest indrawing in the diagnosis of pneumonia in young children. A young child with tachypnoea or chest indrawing who does not have wheeze with a history of wheeze can be presumed to have pneumonia even if the child does not have focal chest signs or fever.

Many respondents chose not to give antibiotics and the panel felt this may well be because the child did not appear to be ill or febrile. The panel did not like the term "she does not look toxic"; they felt it left too much for respondents to guess at.

Expert commentary: This is a tricky one. According to some sources a tachypnoea of 47/min increases the chance of pneumonia in which case antibiotics would be indicated. The decision to give an antibiotic is not clear cut and such a decision may take into account the time of day, chance of seeing the child if deterioration is likely, the home environment. If an antibiotic were to be given then amoxicillin in the 90mg/kg/day range would be my choice.

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