Abstract: Health-care professionals who manage children are regularly confronted with clinical questions regarding the management of the full spectrum of otitis media: acute otitis media; otitis media with effusion; and chronic suppurative otitis media. Given the variety of potential therapies available, the wide spectrum of middle ear disorders, and the lack of consensus about management strategies, clinicians are in a difficult position when managing these children. In this review, we seek to summarise the current best evidence for answering otitis media management questions by collating existing systematic reviews.

Key words: Aboriginal; children; management; otitis media.

Introduction
Middle ear disease in children spans human history. For thousands of years, various treatments for otitis media (OM) have been suggested, including: goats' urine and bats' wings, incising the eardrum, vinegar washes, drinking butter and maintaining silence.1,2 Hippocrates recommended breast milk, sweet wine and avoidance of smokey rooms, reserving topical therapy with lead powder for severe cases.2 Although OM is very common worldwide, has a long history and has been the subject of multiple randomised controlled trials, there remains a great deal of variability in clinical practice in Australia and around the world.1-6 Australian health-care professionals need to be familiar with current evidence for OM management because Indigenous children are one of the most at-risk groups in the world.7-9 Since the 18th century, when letters from Australian settlers documented profusely draining ears in the local Indigenous children,10 numerous studies have highlighted the discordant OM burden suffered by Indigenous versus other Australian children, particularly those living in remote communities.5,7,11,12 Australian Indigenous children experience OM at a younger age,10,13,14 and have more frequent, more severe, more prolonged and more complicated OM than any other comparable population group around the world.5-9

OM is not just a major cause of morbidity in Indigenous children. OM affects nearly every child at least once,15 is one of the most common causes of health-care presentations,5,12 antibiotic prescriptions,5,13 and hearing impairment in children.16 The magnitude of this morbidity burden is highlighted by the 2003 estimate that net costs of OM management total $US 5 billion in the United States17 and are of comparable magnitude in a recent Australian analysis.18

Health-care professionals who manage children are regularly confronted with clinical questions regarding the management of the full spectrum of OM; acute otitis media (AOM), otitis media with effusion (OME) and chronic suppurative otitis media (CSOM). Given the variety of potential therapies available, the wide spectrum of middle ear disorders, and the lack of consensus about management strategies, clinicians are in a difficult position when managing these children. In this review, we seek to summarise the current best evidence for answering OM management questions by collating existing systematic reviews.

Key Points
1 Indigenous children with acute otitis media (AOM) should be treated with Amoxycillin at the initial visit. Immediate antibiotic therapy is optional for non-Indigenous children with AOM, but children younger than 2 years with bilateral disease and those with otorrhoea are most likely to benefit.
2 Children with otitis media with effusion (OME), and no speech and language delays, can be observed safely for 3–6 months. If the effusion has not resolved by then, referral to an Ear Nose and Throat surgeon for ventilation tube insertion should be arranged for children with bilateral hearing loss >25 dB.
3 Children with chronic suppurative otitis media (CSOM) need ear cleaning (e.g. dry mopping or betadine washouts) and topical antibiotics (e.g. ciprofloxacin ear drops) until the discharge resolves.

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Methods
We performed an electronic search for relevant studies using Medline (1950 to February 2009) by exploding the term ‘OM’ and limiting to the publication types ‘meta-analysis’ or ‘review’, and the language field ‘English’. We also searched the Cochrane database for evidence-based medicine reviews. All systematic reviews which examined any management issue for any form of OM were included. Only the most recent version of a review was included when updates had been completed. Reviews identified from other sources or known to the authors were also included. Where possible, we presented data on the number of patients needed to treat per treatment for each outcome of interest. The search identified two systematic reviews on risk factors for OM, 14 on management of AOM, 10 on management of OME, and 3 on other relevant topics.

Risk Factors for OM
There are two systematic reviews of risk factors for AOM and recurrent AOM and both identified the presence of siblings, day-care attendance, exposure to tobacco smoke, pacifier or ‘dummy’ use and lack of breast feeding as significant risk factors. However, each factor, separately, had only a modest effect (see Table 1).

Children at high risk of OM and its complications should be considered differently to the majority of children. Australian Indigenous children have consistently been shown to be at extremely high risk for severe, complicated OM. The Office of Aboriginal and Torres Strait Islander Health produced guidelines in 2001, which recommend more aggressive therapy for Indigenous than other Australian children based on their higher disease risk (see Therapeutic Guidelines).

Another group at high risk of OM and its complications is children with craniofacial abnormalities, such as cleft palate.

Diagnosis
A major obstacle to consistent management of OM is the lack of universally accepted diagnostic criteria (see Fig. 1). In a survey of 165 clinicians, 147 different clinical definitions of AOM were provided, with no definition used by more than six clinicians.

Diagnosis of either AOM or OME requires the presence of an effusion, which can be reliably detected only by tympanometry and pneumatic otoscopy. Despite this, neither of these techniques is widely used in Australian Aboriginal Medical Services. We do not have any information on the use of these diagnostic techniques in other general practice or paediatric settings in Australia.

Case definitions: AOM (see Fig. 1a)
The Agency for Healthcare Research and Quality, the American Academy of Pediatrics and the Australian Therapeutic Guidelines currently use similar criteria to define AOM. The definition of AOM can be summarised as:
1. Acute onset (within 48 h).
2. Middle ear fluid (such as bulge, absent movement or bubbles).
3. Signs and symptoms (such as tympanic membrane redness, otalgia or fever).

OME (see Fig. 1b)
OME can be defined as the presence of middle ear effusion without signs of acute infection. The presence of bubbles (or an air-fluid level) in the middle ear cavity is a reliable sign of middle ear effusion but their absence does not reliably exclude effusion.

CSOM (see Fig. 1c)
CSOM is persistent discharge of pus through a perforated tympanic membrane. The duration of ‘persistent’ varies in different studies. The World Health Organization uses a definition of 2 weeks. If the discharge is of shorter duration, the child would be considered to have AOM with perforation.

Diagnostic Box
Pneumatic otoscopy
Pneumatic otoscopy requires an otoscope and a pneumatic attachment – an insufflator like the blood pressure cuff bulb. A small jet of air is pushed into the external ear canal. If there is an air-tight seal, the air jet will cause the tympanic membrane to move. If middle ear fluid is present, the tympanic membrane will either move sluggishly or not at all. Pneumatic otoscopy has good sensitivity (94%) and specificity (80%) for the detection of middle ear effusion, using myringotomy findings as the gold standard, when performed by experienced clinicians. It is used routinely by clinicians in the United States. The pneumatic attachment can be purchased from your medical supplier for approximately $20 AUD.

Tympanometry (see Fig. 2)
A tympanometer has a microphone, speaker and manifold. The speaker emits a constant sound (e.g. at 226 Hz), the ear canal pressure is varied (+200 to −400 daPa) and the

Table 1 Risk factors for recurrent acute otitis media (AOM)*

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Risk of</th>
<th>RR</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family history of AOM</td>
<td>AOM</td>
<td>2.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Daycare outside home</td>
<td>AOM</td>
<td>2.5</td>
<td>0.003</td>
</tr>
<tr>
<td>Not breastfeeding at all</td>
<td>Recurrent AOM</td>
<td>2.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>At least one sibling</td>
<td>Recurrent AOM</td>
<td>1.9</td>
<td>0.001</td>
</tr>
<tr>
<td>Child care outside home</td>
<td>Recurrent AOM</td>
<td>1.8</td>
<td>0.004</td>
</tr>
<tr>
<td>Parental smoking</td>
<td>AOM</td>
<td>1.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Family daycare</td>
<td>AOM</td>
<td>1.6</td>
<td>0.002</td>
</tr>
<tr>
<td>Pacifier use</td>
<td>AOM</td>
<td>1.2</td>
<td>0.008</td>
</tr>
<tr>
<td>Breast feeding &lt;3 months</td>
<td>AOM</td>
<td>1.2</td>
<td>0.003</td>
</tr>
</tbody>
</table>

*Source: Uhari M et al.20
microphone picks up the returning soundwaves. The tympanometer measures the admittance or impedance and also estimates the ear canal volume. Tympanometry involves insertion of the earpiece into the external ear canal to establish an air-tight seal. The tympanometer takes a few seconds to generate a graph/pressure and volume measurements. When performed by an experienced operator and using B or C2 curves, tympanometry has good sensitivity (94%) but poor specificity (62%) for detection of middle ear effusion against myringotomy.26 Specificity can be improved using a different cut-off (static compensated acoustic admittance of 0.1 mmHg) but this reduces sensitivity (34%).26 The best results are obtained when B curves (flat tympanograms) are used as the cut-off for middle ear effusion (81% sensitivity and 75% specificity).26 Remember: do not attempt tympanometry in the presence of a discharge.

Table 2 Summary of Australian and international guidelines for antibiotic management of AOM at initial consultation

<table>
<thead>
<tr>
<th>Guideline</th>
<th>For all age groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian OATSIH Guidelines</td>
<td>Amoxicillin 50 mg/kg/day for seven days</td>
</tr>
<tr>
<td></td>
<td>If perforation, amoxicillin 50–90 mg/kg/day for 14 days</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Infants &lt;6 months</th>
<th>Infants 6 months to 2 years</th>
<th>Children ≥2 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian Therapeutic Guidelines (antibiotic)</td>
<td>Amoxicillin (45 mg/kg/day)</td>
<td>Observation for one day</td>
<td>Observation for two days</td>
</tr>
<tr>
<td>American Academy of Pediatrics</td>
<td>Amoxicillin (80–90 mg/kg/day)</td>
<td>If vomiting and fever, amoxicillin 45 mg/kg/day for five days</td>
<td>If vomiting and fever, amoxicillin 45 mg/kg/day for five days</td>
</tr>
<tr>
<td>United Kingdom NHS Guidelines</td>
<td>Amoxicillin** (20–40 mg/kg/day) for five days</td>
<td>Amoxicillin** (20–40 mg/kg/day) for five days</td>
<td>Amoxicillin** (20–40 mg/kg/day) for five days</td>
</tr>
</tbody>
</table>

*Severe = high fever (>39°C), severe pain, perforation, bilateral disease. **The UK guidelines use an age-based rather than weight-based dosing schedule, so the dosing regimens presented here are estimates. After the observation period, most guidelines recommend starting antibiotics if symptoms persist.

Fig. 1 Typical middle ear appearances. (a) Acute otitis media, (b) Otitis media with effusion with ventilation tube, (c) Chronic suppurative otitis media, (d) Normal middle ear appearance. (Images a, b and c courtesy of Professor Harvey Coates.)
AOM: to treat or not to treat – that is the question (see Table 3)

The debate about whether or not to prescribe oral antibiotics at the first consultation for AOM still rages. In Australia and North America, most children are given antibiotics, whereas in The Netherlands, Denmark and Norway children are increasingly managed with ‘watchful waiting’. Meta-analyses of antibiotics show a consistent but small clinical benefit from oral antibiotics in AOM which needs to be balanced against the similar risk of side effects. Those ‘for’ antibiotics argue that some of the children in the primary studies included in the meta-analyses may have had OME rather than AOM, which could have diluted the magnitude of the effect of antibiotics. Those ‘against’ antibiotics argue that the small benefit from antibiotic therapy is outweighed by the harms. It is also likely that in the routine clinical setting, as opposed to clinical trials, inadequate or misinterpreted middle ear examination is much more prevalent, particularly in young infants.

These reviews have been largely focused on children presenting with the initial symptoms of AOM (ear pain). In the watchful waiting cases, failures may still end up being treated with antibiotics over the next few days. It is also important to emphasise that all children should be treated for the symptoms of AOM. There is evidence favouring simple analgesia, such as paracetamol or ibuprofen, but anti-histamines and decongestants, whether alone or in combination, have no proven benefit and some proven harms and so are not recommended (see Table 3).

The concern has been raised that this ‘watchful waiting’ approach could lead to more supplicative complications of OM, such as mastoiditis. Antibiotic use for OM in the primary healthcare setting over the last decade has reduced substantially in the UK. However, a time trend analysis did not show a concomitant significant increase in the rate of mastoiditis, rheumatic fever or peritonsillar abscess presentations to hospital. If this is translated into general practice behaviour, it is estimated that more than 2500 children with OM would need to be treated with antibiotics to prevent a single case of mastoiditis. The decreased rates of mastoiditis and other severe infections are more likely to be related to other public health measures than to antibiotic use.

At the initial consultation for AOM, clinicians and families may choose from three broad options: to use oral antibiotics, to not use oral antibiotics (watchful waiting) or to provide a prescription for oral antibiotics, which the family can fill if the child's symptoms persist. In one study, only 24% of UK parents in the delayed prescription group went on to fill the script. For those choosing to treat children with AOM with antibiotics, the strongest evidence exists for young infants (0–2 years) with bilateral disease and any child with otorrhoea. For the outcomes of pain and/or fever at 3–7 days, for every 4 children with these features treated, one child will have pain/fever prevented.

The Australian Therapeutic Guidelines recommends 5 days of amoxycillin as first-line treatment if antibiotics are given for AOM but recommends a dose of only 50 mg/kg/day compared with US recommendations of 80–90 mg/kg/day (see Table 2). There is no evidence that any antibiotic is superior to amoxycillin, but in cases due to pneumococci with intermediate resistance to penicillin, doses in the higher dosage range would be needed. Outcomes following 7–10 days courses are similar to shorter treatment courses.

OME (‘glue ear’)

The majority of new middle ear effusions will clear spontaneously by three months so it is reasonable to wait for this period before instituting additional therapy. There is no evidence to support the immediate use of antibiotics following a new diagnosis of OME, but only 20% of effusions which have...
been present for three months will clear over the next three months. In these children, systematic reviews support treating children with long-term oral antibiotics to hasten resolution, but the benefits are modest.40,44 There is some evidence for oral and topical steroids in the short-term but no evidence that they have an effect in the longer term.45 There is evidence of harm from decongestants and antihistamines in about 10% of children (including gastrointestinal upset, irritability, drowsiness or dizziness) and these therapies are not recommended (see Table 4).

Children with prolonged middle ear pathology, such as effusions persisting longer than 3 months and those with associated hearing impairments should be referred to an Ear Nose and Throat specialist (ENT). During the ENT consultation, the

Fig. 3  Simplified flowchart of management options for otitis media with intact tympanic membrane. AOM, acute otitis media; OME, otitis media with effusion (glue ear); TM, tympanic membrane.
benefits and harms of inserting ventilation tubes and, in recurrent cases, adenoidectomy should be discussed with the family. Ventilation tubes reduce the mean time with effusion by 32% over the next year and improve hearing, particularly over the 6–9 months post-operation. Theoretically, transient improvement in hearing is most likely to benefit very young children at a critical stage of language development. The benefits need to be weighed against the risks of surgery. However, risks are low in a specialised centre with paediatric anaesthetists and adequate follow-up. Tympanosclerosis (or tympanic membrane scarring) is common after surgery, but not clinically important. Ventilation tubes are complicated by persistent perforation in 2% of children with short-term tubes and up to 17% with long-term tubes. Some of these perforations develop into chronic ear discharge. Insertion of ventilation tubes is now by far the most important risk factor for CSOM in developed countries. Finally, despite short-term improvement in hearing, there is no evidence for long-term improvement in either hearing or language development, although these findings may not be generalisable to the Australian context and in particular to disadvantaged Australian Indigenous children.

### Table 3 Systematic reviews on AOM management

<table>
<thead>
<tr>
<th>Review year (source)</th>
<th>Included studies</th>
<th>Review population</th>
<th>Comparison</th>
<th>Outcome measures and results (95% confidence intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thanaviratananich 2008 (Cochrane)</td>
<td>6 RCTs</td>
<td>1601 children (0–12 years)</td>
<td>One or two daily doses vs. Three or four daily doses of Amoxicillin (+-clavulanate)</td>
<td>• Too much risk of bias associated with evidence to make recommendations</td>
</tr>
<tr>
<td>Coleman 2008 (Cochrane)</td>
<td>15 RCTs</td>
<td>2695 children</td>
<td>Decongestant/antihistamines vs other</td>
<td>• NNT = 10 with combined decongestant-antihistamine to prevent recurrent AOM*</td>
</tr>
<tr>
<td>Rovers 2006 (Lancet)</td>
<td>6 RCTs</td>
<td>1643 children (6 m to 12 years)</td>
<td>Antibiotics vs. other</td>
<td>• Five to eight fold increased risk of side effects</td>
</tr>
<tr>
<td>Leach 2006 (Cochrane)</td>
<td>16 RCTs</td>
<td>1483 children at increased risk AOM</td>
<td>≥6 w antibiotics vs. placebo</td>
<td>• No benefit in early cure rates, symptom resolution, prevention of surgery or other complications</td>
</tr>
<tr>
<td>Foxlee 2006 (Cochrane)</td>
<td>4 RCTs</td>
<td>Adults and children</td>
<td>Analgesic otic preparation without antibiotics vs. Placebo or non-analgesic</td>
<td>• Reduced parent satisfaction, OR = 0.51 (0.35 to 0.73).</td>
</tr>
<tr>
<td>Glasziou 2004 (Cochrane)</td>
<td>8 RCTs</td>
<td>2287 children</td>
<td>Antimicrobials vs. Placebo</td>
<td></td>
</tr>
<tr>
<td>Spurling 2004 (Cochrane)</td>
<td>9 RCTs</td>
<td>Children and adults</td>
<td>Delayed antibiotics vs. No or immediate antibiotics</td>
<td>• No reduction in pain at 24 h</td>
</tr>
<tr>
<td>Rosenfeld 2003 (Laryngoscope)</td>
<td>63 RCTs and cohort</td>
<td>8101 children (6 m–20 years)</td>
<td>Natural history of untreated AOM</td>
<td></td>
</tr>
<tr>
<td>Takata 2001 (Pediatrics)</td>
<td>9 RCTs</td>
<td>&gt;1518 children (1 m–18 years)</td>
<td>Antibiotics vs. Other</td>
<td>• 61% had symptom relief within 24 h</td>
</tr>
<tr>
<td>Kozyrskyj 2000 (Cochrane)</td>
<td>30 RCTs</td>
<td>1524 children with AOM (1 m–18 years)</td>
<td>Antibiotic course &lt;7 days vs. Antibiotic course &gt;7 days</td>
<td>• 80% spontaneous resolution by 3 days in untreated group</td>
</tr>
<tr>
<td>Rosenfeld 1994 (J Ped)</td>
<td>33 RCTs</td>
<td>5400 children (1 m–18 years)</td>
<td>Antibiotics vs. Other</td>
<td>• NNT = 8 to prevent clinical failure at 2–7 days</td>
</tr>
<tr>
<td>Williams 1993 (JAMA)</td>
<td>9 studies</td>
<td>958 children</td>
<td>Prophylactic antibiotics vs. Other</td>
<td>• Long term outcomes were similar following a 5 day course of antibiotics compared with a 8–10 day course</td>
</tr>
</tbody>
</table>

*Higher quality studies showed no benefit and no study with allocation concealment showed any benefit. AOM, acute otitis media; NNT, number needed to treat; OR, odds ratio; RCT, randomised controlled trials.
Pharmaceutical Benefits Scheme (PBS) to Aboriginal and Torres Strait Islander children over one month of age. The consensus is that the huge burden of OM disease in the Indigenous population overrides any concerns about the development of drug resistance.

While topical antibiotics are superior to oral antibiotics, the role of oral antibiotics in additional to topical antibiotics is uncertain. If chronicity is possible or if the perforation is very small, the child should be treated with topical and oral antibiotics (as for AOM with perforation).55 For children with established CSOM, topical antibiotics alone are recommended.55 A recent Dutch study showed a reduction in discharge when oral cotrimoxazole was added to standard topical therapy. This benefit did not persist after the oral antibiotics were ceased.55

### Conclusion

The management of OM, as with other conditions, should be based on the best available evidence. Evidence from systematic reviews provide a solid foundation for making management decisions, but clinicians also need to consider the individual circumstances of their own patient populations. In
this review we have synthesised the current evidence regarding OM management from recent systematic reviews, so that health-care professionals managing these children can make informed decisions and can discuss the pros and cons of the different management options with the child’s parents and carers.

References


Clinical Quiz
Q1. Aiden, a 6 year old boy, is brought to you with a history of recurrent otitis media. His right external ear canal is full of purulent discharge. What is the most likely diagnosis and best management strategy?
A. He has acute otitis externa and should be treated with ear wicks and topical steroid and antibiotic drops instilled with tragal pressure.

B. If Aiden is reported to have had the discharge for 2 months he should be treated with regular ear cleaning and topical antibiotic drops but does not need initial oral antibiotic therapy.

C. He should be treated with topical ciprofloxacin drops for chronic suppurative otitis media alone.

D. If the discharge is new he should be treated with topical antibiotic with corticosteroids as oral antibiotics have never been shown to improve outcomes in acute otitis media with otorrhoea.

Q2. Mary is an 18 month old Aboriginal girl from a remote community. She is brought to you as she has a developed a low grade fever today and is pulling at her left ear. On examination you notice that it is her right ear that is bulging, red, opaque, and does not move on pneumatic otoscopy. The left tympanic membrane looks normal. What is the best approach?

A. She has right acute otitis media and should be started on oral antibiotics immediately as she comes from a high-risk group.

B. She has bilateral acute otitis media and should be started on oral amoxycillin 50 mg/kg/day for 7 days according to the OATSIH guidelines.

C. She has right otitis media with effusion and needs an urgent hearing test as she is at risk of long-term learning disability if ventilation tubes are not provided within the next 4 to 6 weeks.

D. She has right acute otitis media and could be managed with watchful waiting as she is over 1 year of age.

Q3. A 3 year old Sudanese refugee child called Majak is brought to see you for a general health check. She has opaque tympanic membranes bilaterally. Both eardrums move sluggishly on pneumatic otoscopy and have flat tympanograms (Type B). His mother tells you that he never listens to her and has been very naughty in the last year. Which of the following is the best approach?

A. He has bilateral effusions and needs tympanostomy tubes.

B. He has bilateral acute otitis media and should be started on oral antibiotics immediately as he is from a high risk group.

C. Flat (Type B) tympanograms are normal. Peaked tympanograms are abnormal as the peak is a measure of the degree of bulging.

D. He has bilateral otitis media with effusion and can be observed for 3 months. He should have a hearing test if not previously done or if the effusions do not resolve over the next 3 months.

Clinical Quiz Answers

Q1. A. Incorrect: Acute otitis media with perforation and chronic suppurative otitis media are more likely than acute otitis externa in children.

B. Correct: In the Macfadyen systematic review ear cleaning and topical therapy were the best treatment options for CSOM.

C. Incorrect: Therapeutic Guidelines (Antibiotic) and the OATSIH guidelines for Aboriginal children, both recommend ear cleaning (dry mopping with rolled tissue spears) before instilling drops for CSOM.

D. Incorrect: AOM with otorrhoea is much more likely to benefit from oral antibiotics than AOM without otorrhoea [see Rovers review]

Q2. A. Correct: Aboriginal children with AOM should be treated with oral amoxycillin [see OATSIH Guidelines from 2001].

B. Incorrect: Her left ear does not have an effusion (a requirement for any diagnosis of AOM or OME), so this is unilateral AOM.

C. Incorrect: She is unlikely to have a bilateral hearing loss as the left ear is normal. There no evidence of long-term learning benefits from early instillation of ventilation tubes [Paradise study]. Data from high-risk populations are lacking.

D. Incorrect: Aboriginal children with AOM should be treated with oral amoxycillin [see OATSIH Guidelines from 2001]. For non-Aboriginal children, this approach would be reasonable [see Rovers review].

Q3. A. Incorrect: The majority of middle ear effusions in children resolve within 3 months and no intervention is required acutely.

B. Incorrect: The presentation is more consistent with OME than AOM. Refugee children may be at increased risk due to poverty and poor general health but African children in general are not a high-risk group.

C. Incorrect: Flat tympanograms (Type B) accurately indicate the presence of middle ear effusions and high peaked tympanograms (Type A) accurately indicate no effusions. [See Takata review] Other tympanogram types are not accurate at predicting effusions.

D. Correct: Children with bilateral effusions will have some degree of hearing impairment and the parents need to be aware of this. A hearing test is a good idea in this situation and is recommended for children with bilateral disease which does not resolve by 3 months.