



<b>GUIDELINE</b>	
<b>Hearing and Ear Health</b>	
<b>Scope (Staff):</b>	Community health staff
<b>Scope (Area):</b>	CAHS-CH, WACHS
<b>Child Safe Organisation Statement of Commitment</b>	
The Child and Adolescent Health Service (CAHS) commits to being a child safe organisation by meeting the National Child Safe Principles and National Child Safe Standards. This is a commitment to a strong culture supported by robust policy documents to ensure the safety and wellbeing of children at CAHS.	

**This document should be read in conjunction with this [DISCLAIMER](#)**

### **Aim**

To promote the wellbeing and development of children by timely surveillance, screening and identification of childhood hearing impairment and/or ear disease.

To understand the importance of appropriate hearing function and the impact that hearing impairment has on the development and health of a child.

### **Risk**

Unrecognised and/or unmanaged ear disease and hearing impairment can have a significant effect on a child’s speech and language, social and psychological development, educational progress and long term social and vocational outcomes.

### **Background**

Normal hearing is vital for the development of language and communication in children.<sup>1</sup> Impaired hearing that occurs at key developmental periods early in a child’s life can significantly affect speech, language, social and cognitive development. In turn, this may lead to poor attention and listening, and behavioural problems, making it difficult to engage in school and learning. Longer term outcomes include poor academic performance, limited employment options and income, antisocial behaviour, and increased contact with Police and the criminal justice system.<sup>2,3</sup>

Hearing loss may result from a variety of issues including; genetic causes, complications at birth, infectious diseases, chronic ear infections, use of certain medicines, injuries and accidents, exposure to loud noise and aging.<sup>4</sup> While universal neonatal screening enables early identification and intervention for congenital hearing issues, otitis media (OM) and associated conditions are common causes of temporary and longer term hearing impairment in early childhood, especially for Aboriginal children.<sup>5</sup>

A large scale Australian longitudinal study explored the impact of ear infection and health impairment among indigenous and non-indigenous children. It was estimated that at least half of all children experience at least one episode of OM up to the age of three years. It was found that children who experienced repeated ear infection were significantly more likely to sustain hearing loss and increased risk of poor health and developmental outcomes.<sup>5</sup> Although comprehensive data is not available, there is strong clinical and epidemiological evidence that recurrent infections, ear disease and hearing loss are highly

prevalent among Aboriginal children. <sup>6</sup>Aboriginal populations have the highest rates of severe and persistent OM described in the medical literature. <sup>7</sup>

The *WA Child Ear Health Strategy 2017-2021* promotes a strong focus on all children aged 0-5 years to achieve change in prevention, early intervention and effective management. <sup>8</sup> Subsequently, the Western Australian Auditor General recommended additional screening and prevention activity to address the burden of ear disease among Aboriginal children. <sup>9</sup>

The *Child Ear Health Services: Co-Design Framework* has been developed by WA Country Health Service (WACHS) in collaboration with Child and Adolescent Health Service (CAHS) and the Aboriginal Health Council of WA (AHCWA). This resource provides information for clinicians regarding the co-design process to engage Aboriginal families and communities as co-leaders, in the planning and designing of services to meet people's needs. (see link in *Related WACHS Resources*)

## Key Points

- The schedule for ear health and hearing screening for WA children is outlined in Table 1 (page 5) in this document.
- Hearing screening should only be performed by community health staff who have undertaken appropriate CAHS-CH or WACHS (or equivalent) training and been deemed competent in the procedures.
- Hearing risk factors are identified at each universal contact.
- Children with identified concerns are offered referral, liaison, and advocacy as required.
- Families will be provided with key health education messages to promote ear health and hearing as appropriate to their circumstances, and strategies to support prevention, early detection and management (See Appendix A).
- Staff to conduct screening in accordance with the otoscopy, audiometry and tympanometry procedures in the Community Health Manual.
- Regular and opportunistic ear health screening for Aboriginal children aged 0 – 5 years is critical to enabling early identification of abnormalities, preventing ear disease and optimising health and development.

## Development of hearing

Auditory development in the foetus and infant has its own defined sequence. Structural parts of the ears develop in the first 20 weeks of gestation, and the neurosensory part of the auditory system develops primarily after 20 weeks' gestational age. The auditory system becomes functional at around 25 weeks' gestation, when the foetus is able to detect and interpret sounds heard in the womb. <sup>10,11</sup> At birth, infants show a preference for their mother's voice.

The neural connections required to receive, recognise and react to a range of sounds, such as language and music, are functioning between 28-30 weeks' gestational age. <sup>11</sup> This process begins during the final 10-12 weeks of gestation and continues for several years after birth. <sup>11</sup> Infants who have not been adequately exposed to a range of frequencies in utero will experience two months of language delay due to insufficient tuning of hair cells. <sup>11</sup>

A child gradually learns how to integrate hearing into their developing language. From a very young age, children must be exposed to speech at close proximity for normal hearing to develop. Through this exposure, infants learn about a wide range of different sounds adding greatly to their understanding of their environment and capacity to interact with it in a meaningful way.<sup>12</sup> The sounds an infant makes are also affected by what they hear.

Listening is the learned use of hearing. Listening skills include the ability to discriminate between the frequency, duration and rhythm of different sounds, hearing in the presence of background noise, accurate interpretation of the meaning of the sound and the ability to concentrate or pay attention.<sup>12</sup>

## **Hearing loss and disorders of the ear**

There are three types of hearing loss, categorised as conductive, sensorineural or mixed.<sup>1</sup> Hearing loss may be congenital or acquired.

### ***Conductive hearing loss***

Conductive hearing loss is caused by a physical blockage or mechanical problem which interferes with sound transmission through the outer or middle ear. Conductive hearing loss is usually acquired, with causes including wax blockage, foreign object in ear canal, various forms of OM, perforated ear drum and a break in one of the ossicles. Most of these conditions can be treated and corrected by medical or surgical intervention, and/or use of amplification.<sup>1</sup>

### ***Sensorineural hearing loss***

Sensorineural hearing losses are caused by damage to the hair cells of the inner ear, the auditory nerve or brain. Sensorineural hearing loss is considered to be permanent; however, most cases can be assisted with amplification. Tinnitus is common among those with sensorineural hearing loss.<sup>1</sup>

The more common causes of sensorineural hearing losses include noise exposure, aging, meningitis, genetic factors, certain drugs, certain pre-natal conditions and some viruses.<sup>1</sup>

### ***Mixed hearing loss***

Mixed hearing loss is a combination of conductive and sensorineural hearing loss. Children with mixed hearing loss require management for the cause of the conductive loss, and will likely require medical and/or surgical intervention as well.<sup>1</sup>

*Refer to Appendix B for information regarding the grades of hearing loss in children.*

## **Otitis media**

Otitis media (OM) refers to inflammation and infection of the middle ear space. It is a complex condition that is associated with both illness and hearing loss, and is best considered as a spectrum of diseases that ranges from mild (OM with Effusion) (OME) to severe (Chronic Suppurative Otitis Media (CSOM) (See Appendix C for more information). At some time, every child from all populations, will experience episodic OME, and most children will experience at least one episode of acute OM (AOM). In developed countries, spontaneous improvement will occur in most children. However, children who suffer frequent episodic AOM or persistent OME, which is usually a problem in the first six years, are of concern, with spontaneous resolution more likely in older children. Children who develop CSOM (the most severe form of OM) are most likely to experience problems as

adults. Unfortunately, for some of these affected individuals, OM, and its associated hearing loss, is a lifelong problem.<sup>7</sup>

AOM is either self-limiting or can be treated effectively with antibiotics. OM may become recurrent and/or lead to perforation of the ear drum. Recurrence may lead to OME, or 'glue ear' with associated (reversible) hearing impairment. When an ear drum perforates and does not heal, pathogens (such as *Pseudomonas aeruginosa* and *Staphylococcus aureus*) may become established, resulting in CSOM. This condition may persist for months and years, leading to destruction of the bone in and around the ear and permanent hearing loss.<sup>13</sup> Ongoing infection may indicate an ear cyst or cholesteatoma in the middle ear and can be life threatening.<sup>1</sup> Specialist intervention may be required for those afflicted by chronic ear disease including audiology, speech pathology and surgery.<sup>13</sup>

CSOM and persistent OME, often termed 'ear disease' are associated with poor social determinants and poverty. Australian Aboriginal children have among the highest prevalence of ear disease in the world.<sup>3</sup> Others at risk include; those with Down Syndrome, unrepaired cleft palate or cranio-facial disorders, and children from refugee backgrounds or migrants from high risk countries.<sup>13</sup>

Prevalence of CSOM above 4% is considered to be a serious public health issue by the World Health Organisation. In some WA Aboriginal communities with poor living conditions, the prevalence is significantly higher.<sup>1</sup> It is estimated that Aboriginal children experience up to 32 months of conductive hearing loss in their first five years of life, leading to long impact on speech and language, educational and vocational outcomes.<sup>1</sup> It has been found that up to 90% of Aboriginal prison inmates have hearing loss.<sup>3</sup> Further, in some areas such as rural and remote Aboriginal communities, the clinical course of OM involves early age of onset, long duration and high prevalence of severe disease.<sup>7</sup>

## Risk Factors

Risk factors for hearing impairment or loss: <sup>1,14</sup>

- Recurrent or persistent OME
- CSOM
- Family history of congenital, sensorineural hearing loss
- History of rubella, cytomegalovirus, toxoplasmosis, syphilis or herpes during pregnancy
- Dysmorphic deviations: e.g., low set ears, skin tags, accessory tragi, malformed auricles, auricular sinus, peri auricular sinus
- Hyperbilirubinemia requiring exchange transfusion
- Birthweight less than 1500gms
- Genetic syndromes known to include sensory hearing loss, e.g., Down's Syndrome
- Head trauma with fractured temporal bone
- Infectious diseases e.g., measles, mumps and rubella
- Ototoxic medication, e.g. gentamycin
- Neurodegenerative disease, e.g., Friedrich's ataxia.
- Use of portable music players.<sup>15</sup>

Risk factors for OM <sup>1,4,13</sup>

- Craniofacial abnormalities

- Infected or enlarged adenoids
- Socio economic disadvantage
- Premature birth
- Not breastfed
- Nutritional deficiencies
- Aboriginal children, especially those residing in remote communities
- Household overcrowding
- Poor hygiene
- Inadequate access to running water
- Poor waste removal and/or poorly functioning sewerage
- Second-hand cigarette smoke.

The following are considered red flag signs of possible hearing problems: <sup>12</sup>

- Lack of awareness of usual environmental sounds
- Less or no vocalising after early babbling or poor or monotonous vocalisations, talking too loudly
- Inattentiveness
- Recurrent ear infections/and or ear discharge
- Not responding when called
- Listening to TV/electronic devices at a loud volume.

**Table 1. Schedule of hearing and ear health screening for WA children**

	<b>All children</b>	<b>Aboriginal children</b>
<b>Birth</b>	Newborn hearing screening	Newborn hearing screening
<b>0-14 days</b> <b>Universal child health contact</b>	Screening questions	Screening questions
<b>8 weeks</b> <b>Universal child health contact</b>	Screening questions	Screening questions Otoscopy Tympanometry
<b>4 months</b> <b>Universal child health contact</b>	Screening questions	Screening questions Otoscopy Tympanometry
<b>12 months</b> <b>Universal child health contact</b>	Screening questions	Screening questions Otoscopy Tympanometry
<b>2 years</b> <b>Universal child health contact</b>	Screening questions	Screening questions Otoscopy Tympanometry
<b>School Entry Health Assessment</b>	Screening questions <sup>a</sup>	Screening questions

<b>Universal child health contact</b>	Otoscopy Audiometry <sup>b</sup>	Otoscopy Tympanometry Audiometry <sup>b</sup>
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- a. Screening questions includes questions included in CHS 409 and asking teacher about concerns for individual children.
- b. Audiometry used as developmentally appropriate for children from 3 years.<sup>2</sup>

**In addition, hearing and ear health screening will occur in the following situations:**

- **Annual ear health screening** will be conducted in school settings for all Aboriginal children attending **Pre-primary and Year 1**. Note; where SEHA is conducted in Pre-primary, additional screening will not be required in that year unless clinically identified.
- In accordance with the **WACHS Enhanced Child Health Schedule** (WACHS only), additional screening will be conducted for vulnerable clients 0-5 years as defined.
- **Opportunistic** ear health screening will be conducted for Aboriginal children and other children at risk attending child health services and programs for reasons outside the universal contact schedule.
- **Primary health care as Universal Plus contacts.** Ear health assessments can be conducted for any children in child health, primary school and secondary school settings in response to concerns from families, clients or teachers, as indicated.

**Collecting hearing and ear health history**

Screening questions (below in Table 2) are suggestions for asking age appropriate questions of parents or caregivers to gather history about children's hearing and ear health. Further health history as relevant for individual children may be based on risk factors (see page 4).

**Table 2. Screening questions and observations**

<b>0 – 14 days Universal child health contact</b>	<p>Did baby have a newborn hearing screen?          Did baby pass or was s/he referred on their newborn hearing screen?          Does baby recognise her/his mother's voice?          Does an awake baby jump at sudden, loud noises like a door slamming or a dog barking nearby?          Does baby cry at very loud sounds?          Do sudden, loud noises wake the baby?</p> <p><u>Observations</u></p> <ul style="list-style-type: none"> <li>• May 'corner' eyes reflexively to side of noise</li> <li>• Shows preference to mother's voice</li> </ul>
<b>8 weeks Universal child health contact</b>	<p>Do sudden loud noises wake the baby?          Does the baby cry at very loud noises?          When baby is awake, does s/he jump at sudden, loud noises like a door slamming or a dog barking nearby?          Does baby calm for a short time when s/he hears your voice?          Are you worried about your baby's hearing?</p>

	<p><u>Observations</u></p> <ul style="list-style-type: none"> <li>• Turns head or eyes to sound at ear level</li> <li>• May move head from side to side if searching for sound source</li> <li>• Quietens or smiles at sound of familiar voice before being touched.</li> </ul>
<p><b>4 months</b> <b>Universal child health contact</b></p>	<p>Does baby sometimes turn her/his eyes or start to turn her/his head to see where a noise comes from?</p> <p>Does your baby quieten or smile at the sound of your voice when s/he can't see you?</p> <p>Is baby distracted from feeding by moderately loud sounds nearby?</p> <p>Does baby make a variety of babbling sounds?</p> <p>Does baby enjoy playing with noisy toys or objects?</p> <p>Are you worried about your baby's hearing?</p> <p><u>Observations</u></p> <ul style="list-style-type: none"> <li>• Turns head or eyes to sound at ear level</li> <li>• May move head from side to side if searching for sound source</li> <li>• Vocalises in synchrony to language of caregiver.</li> </ul> <p><u>Signs of Possible Hearing Loss<sup>7</sup></u></p> <ul style="list-style-type: none"> <li>• 3- 6 months - Not communicating by vocalising or eye gaze. Not starting to babble.<sup>7</sup></li> </ul>
<p><b>6 – 9 months</b> <b>Additional contact (as appropriate)</b></p>	<p>Does your baby turn immediately to a familiar voice across the room?</p> <p>Does baby enjoy playing with noisy toys or objects?</p> <p>Are you worried about your baby's hearing?</p> <p><u>Observations</u></p> <ul style="list-style-type: none"> <li>• Listens to voice when person is not in view</li> <li>• Locates sound made above and below ear level</li> <li>• Turns to sound, particularly voice</li> </ul> <p><u>Signs of Possible Hearing Loss</u></p> <ul style="list-style-type: none"> <li>• 9 months - Poor feeding or oral co-ordination. No gestures (pointing, showing, waving). No 2-part babble (e.g. gaga)<sup>7</sup></li> </ul>
<p><b>12 months</b> <b>Universal child health contact</b></p>	<p>Does baby show pleasure when hearing sounds like food being prepared or kids coming home?</p> <p>Does baby copy words and sounds?</p> <p>Does baby respond when you call from another room?</p> <p>Does s/he respond when you say <i>no</i> or <i>bye-bye</i> not using visual gestures?</p> <p>Does s/he show a quick response to his/her name or other familiar words?</p> <p>Has s/he had many ear infections or colds?</p> <p>Are you worried about your child's hearing?</p> <p><u>Observations</u></p> <ul style="list-style-type: none"> <li>• Knows and turns to own name</li> <li>• Locates sound in any direction</li> <li>• Babbles loudly in conversation style</li> </ul> <p><u>Signs of Possible Hearing Loss</u></p>

	<ul style="list-style-type: none"> <li>• Not babbling. No babbled phrases that sound like talking.<sup>7</sup></li> </ul>
<b>18 months</b> <b>Additional contact (as appropriate)</b>	<p>Does your baby use 10-20 recognisable words?  Does your baby 'talk' with a mixture of babble and words?  Does baby sing along to familiar songs?  Has s/he had many ear infections or colds?  Are you worried about your child's hearing?</p> <p><u>Observations</u></p> <ul style="list-style-type: none"> <li>• Listens and responds to people talking to them</li> </ul>
<b>2 years</b> <b>Universal child health contact</b>	<p>Does your child listen with interest to general conversation?  Is s/he saying 50 or more recognisable words  Can s/he put two or more words together to make a simple sentence?  Has s/he had many ear infections or colds?  Are you worried about your child's hearing?</p> <p><u>Observations</u></p> <ul style="list-style-type: none"> <li>• Direct localisation of sounds to side, above and below.</li> </ul> <p><u>Signs of Possible Hearing Loss</u></p> <ul style="list-style-type: none"> <li>• 20 months – Only pointing or using gestures (i.e. not speaking). No clear words. Cannot understand short requests.</li> <li>• 24 months - Using &lt; 50 words, not following simple requests. Not putting words together. Most of what is said is not easily understood.<sup>7</sup></li> </ul>
<b>3 years</b> <b>Additional contact (as appropriate)</b>	<p>Does your child speak sentences and use many different words?  Has s/he had many ear infections or colds?  Are you worried about your child's hearing?</p> <p><u>Observations</u></p> <ul style="list-style-type: none"> <li>• Answers and asks simple questions</li> <li>• Speech understandable, but has many immature sound substitutions</li> </ul> <p><u>Signs of Possible Hearing Loss</u></p> <ul style="list-style-type: none"> <li>• 30 months – No two-word combinations</li> <li>• 36 months- Speech difficult to understand. No simple sentences.<sup>7</sup></li> </ul>
<b>4 years</b> <b>Universal child health contact (Questions as used in CHS409)</b>	<p>Has anyone in your family had childhood hearing problems?  Has your child had repeated ear infections, discharged from ears, hearing loss, grommets or an ear operation?  Has your child ever had medical care for ears or hearing?  Do you have any concerns or worries about your child's hearing or ears?</p> <p><u>Observation</u></p> <ul style="list-style-type: none"> <li>• Has completely intelligible speech</li> </ul> <p><u>Signs of Possible Hearing Loss</u></p> <ul style="list-style-type: none"> <li>• Speech difficult to understand. Not following directions with 2 steps.<sup>7</sup></li> </ul>



## Follow up and referral pathway

Staff will comply with the specific follow-up and referral processes identified in the individual hearing and ear health procedures.

### References

1. Coates H, Kong K, Mackendrick A, Bumbak P, Perry C, Friedland P, Morris P & Chunghyeon O. *Aboriginal, Torres Strait Islander and Pacific Islander Ear Health Manual*. Perth: Garnett Passe and Rodney Williams Foundation, 2020.
2. Burns J & Thomson N. *Review of ear health and hearing among Indigenous Australians*. Perth: Edith Cowan University, Australian Indigenous HealthInfoNet, 2013.
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7. Technical Advisory Group. *Otitis Media in Aboriginal and Torres Strait Islander Children*. Darwin: Menzies School of Health Research; 2020
8. Government of Western Australia, Aboriginal Health Council of WA, Rural Health West, Telethon Kids Institute (Wesfarmers Centre of Vaccines & Infectious Diseases) & WA Primary Health Alliance. *WA Child Ear Health Strategy*. Perth, 2017.
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10. Duderstadt K. *Pediatric examination: An illustrated handbook*. 2nd ed: Elsevier Health Sciences; 2014.
11. Graven SN, Browne JV. Auditory Development in the Fetus and Infant. *Newborn and Infant Nursing Reviews*. 2008 12//;8(4):187-93.
12. Sheridan MD, Sharma A, Cockerill H. *Mary Sheridan's From Birth to Five Years: Children's Developmental Progress*. 4th ed. Abingdon, Oxon: Routledge; 2014.
13. Department of Health, Western Australia. *Otitis Media Model of Care*. Perth: System Policy and Planning, Department of Health, Western Australia; 2013.
14. Punch R. Incidence, Prevalence, and Aetiology of Childhood Hearing loss. <https://www.deafeducation.vic.edu.au/Resource/fact-sheets/IncPrevAet.pdf>. (No date)
15. le Clercq C, Goedegebure A, Jaddoe V, Raat H, Baatenburg de Jong R & van der Schroeff M. Association between portable music player use and hearing loss among children of school age in the Netherlands, *JAMA Otolaryngology Head Neck Surgery*,

2018, 144(8): 668-675.

16. American Speech-Language-Hearing Assoc. Central Auditory Processing Disorder, <https://www.asha.org/PRPSpecificTopic.aspx?folderid=8589943561&section> (Accessed May 6, 2020).

### Related policies, procedures and guidelines

The following documents can be accessed in the **Clinical Nursing Manual** via the [HealthPoint](#) link, [Internet](#) link or for WACHS staff in the [WACHS Policy](#) link

Audiometry

Otoscopy

Physical assessment 0-4 years Guideline

Tympanometry

Universal Contact - School Entry Health Assessment

Universal Contacts – 8 week, 4 months, 12 months, 2 years

Vulnerable Populations

The following documents can be accessed in the [CAHS-CH Operational Manual](#)

Infection Control manual

The following documents can be accessed in [WACHS Policy](#)

Ear tissue spearing, irrigation and ear drop installation procedure

Enhanced Child Health Schedule

The following documents can be accessed in the [Department of Health Policy Frameworks](#)

Clinical Governance, Safety and Quality

### Related CAHS-CH forms

The following resources and forms can be accessed from the [CAHS-Community Health Forms](#) page on HealthPoint

CHS423 Ear Health Assessment Results

### Related CAHS-CH resources

The following resources and forms can be accessed from the [CAHS-Community Health Resources](#) page on HealthPoint

How Children Develop 0-12 years

Aboriginal Child Health Matrix

### Related WACHS resources

The following resources can be accessed from WACHS Learning Management System Capabiliti

[Child Ear Health Services: Codesign Framework](#)

Ear Health Module 1 – Overview (EHOV EL1)

Ear Health Module 2 – Otoscopy (EHOT EL1)

Ear Health Module 3 – Tympanometry (EHTT EL1)

Ear Health Module 4 – Play Audiometry (EHPA EL1)

Ear Health Module 5 – Referrals (EHRE EL1)

### Related external resources

Coates H, Kong K, Mackendrick A, Bumbak P, Perry C, Friedland P, Morris P & Chunghyeon O. Aboriginal, Torres Strait Islander and Pacific Islander [Ear Health Manual](#). Perth: Garnett Passe and Rodney Williams Foundation, 2020.

[PLUM and HATS speech resource](#) – Pictures and questions to assist with talking to parents about hearing, speech and language, National Acoustic Laboratories.

[Blow-Breathe-Cough Program](#). Hearing Australia resources for teachers and early childhood educators to promote ear health.

[Care for Kid's Ears](#). A wealth of information and resources for parents, early childhood educators, teachers and health professionals. Includes material in several different language groups.

Book: From Birth to Five Years Practical Developmental Examination. 2014. Ajay Sharma and Helen Cockerill

Book: Mary Sheridan's From Birth To Five Years Children's Developmental Progress. 2014. Ajay Sharma and Helen Cockerill

[Otitis Media Guidelines Smartphone App](#). Created by the Centre for Research Excellence in Ear and Hearing Health of Aboriginal and Torres Strait Islander Children. The App is for use by clinicians and health workers who have responsibility for management of OM in Aboriginal and Torres Strait Islander children – in urban, rural and remote populations.

## **APPENDIX A: Key health education messages for children, families, schools and communities to promote ear health and hearing**

Key health education messages for all families, children and/or school staff:

- Promote immunisation and provide information about local clinics.
- Encourage family to eat a healthy diet including iron-rich food and crunchy foods to encourage chewing.
- Avoid tobacco smoke, passive smoking, smoking in pregnancy.
- Breastfeed exclusively for the first six months and continue to 12 months.
- Promote good hygiene;
  - Children and adults to wash hands with soap and water before eating, after going to the toilet, after coughing or wiping nose, before going to bed.
  - Teach children to blow nose to remove all discharge and dispose of soiled tissues appropriately.
  - Keep clean with regular showers.
  - Regularly wash clothes, bed linen and towels.
- Children with ear discharge require nursing or medical assessment.
- Inform parents/caregivers about the importance of prevention, early detection and treatment of OM to prevent associated hearing loss, and poor language, speech, and social skills, and educational disadvantage.<sup>7</sup>
- Encourage Blow-Breathe-Cough activities.

*Additional Key Education Messages for Aboriginal Families and children:*

- Inform parents/caregivers that the onset of OM may occur within the first weeks or months of life, and that the early onset of OM is associated with high risk of:
  - Persistent OME throughout early years, recurrent acute OM, and/or CSOM
  - This may result in hearing loss, language delay, learning difficulties and behaviour problems
  - Children are at increased risk of AOM during other upper respiratory infections
  - Children may not always have all signs of OM, such as ear pain.
- Encourage regular health centre attendance for ear examinations, even if their child is well.
- Encourage attendance at the health centre, particularly if a child is young, as soon as possible whenever ear pain or discharge develops, and to request regular ear examinations. If ear trouble persists for more than three months, advise parents/caregivers that it's time to get a hearing test.
- Inform parents/caregivers that without prompt assistance for children who experience significant hearing loss to hear well, that their listening, language and communication skills may be delayed. Explain:

- That the first four years of life are the most important for learning language and communication skills, and that it is especially important that children hear well at this time.
- That these skills are important for learning language, culture and traditions, and taking part in family and community life, making friends, getting along with others, learning at school, and later, getting a job.<sup>7</sup>

**Strategies to help children to hear and listen:**

Parents/caregivers and family are the most important teachers of language and communication skills.<sup>7</sup> Parents/caregivers can implement these strategies to assist their child to learn listening, language and communication skills:

- Speak clearly and loudly.
- Let the child watch the face of speaker.
- Use amplification for individuals in the classroom.
- Position the child in places to minimise distractions (visual and noise).
- Provide plenty of opportunities to learn speech and language (speaking to child every day, singing, reading, telling stories, reading books together etc).
- Use gestures and pictures.
- When a child has ear and hearing trouble, it's important to increase talking and listening activities at home.<sup>7</sup>

Some parents/caregivers and family may have hearing loss, and will benefit from hearing-friendly communication strategies, such as speaking clearly in a moderate pace, using plain English, rephrasing when necessary, using visual cues, and supporting discussions with visual information.<sup>7</sup>

More detailed strategies for helping children at home and in classrooms are available in: Coates et al. Aboriginal, Torres Strait Islander and Pacific Islander [Ear Health Manual](#). Perth: Garnett Passe and Rodney Williams Foundation, 2020.

**APPENDIX B: Grades of Hearing Loss for Children<sup>7</sup>**

<b>Grade</b>	<b>Corresponding audiometric ISO value (in the better ear)</b>	<b>Performance</b>
None or Slight	20 dB or lower	No or very slight hearing problems. Able to hear whispers.
Mild	21-31 dB	Not able to hear and repeat words spoken in normal voice at >1 metre.
Moderate	31-60 dB	Not able to hear and repeat words spoken in raised voice at >1 metre.
Severe	61-80 dB	Not able to hear most words when shouted into better ear.
Profound	81 dB or greater	Unable to hear or understand even a shouted voice.

**APPENDIX C: Childhood ear disorders**

Disorder <sup>1,9</sup>	Main causes	Signs and symptoms
<b>Outer ear disorders</b>		
Deformities of the pinna or canal	Congenital anomalies	Diminished sound conduction
Ear wax	Excessive wax causing a plug	Occluded ear canal Hearing difficulties
External infection of the pinna	Infection as a result of trauma e.g ear piercing, insect bite, eczema	<ul style="list-style-type: none"> <li>• Itching</li> <li>• Pain</li> <li>• Redness, swelling</li> </ul>
Foreign bodies	Small objects, e.g. seeds, beans, stones, beads or insects  Sand  Fungal infections	Visible in the ear canal Hearing difficulties
Otitis externa	<ul style="list-style-type: none"> <li>• Infection of hair follicle</li> <li>• Poking with cotton wool or other objects</li> <li>• Humidity and moisture</li> <li>• Contaminated water</li> <li>• Contact allergy</li> <li>• Pre-existing skin disease</li> </ul>	<ul style="list-style-type: none"> <li>• Itching</li> <li>• Scaling skin or scanty discharge</li> <li>• Severe pain and redness</li> <li>• Oedema</li> <li>• Hearing difficulties</li> </ul>
<b>Middle ear disorders</b>		
Cholesteatoma	Accumulation of normal lining skin of the eardrum in the middle ear or parts of the temporal bone.	<ul style="list-style-type: none"> <li>• Gradually increasing hearing loss</li> <li>• White mass in the tympanic membrane or middle ear.</li> </ul>
Dry perforation <i>Inactive CSOM</i>	<ul style="list-style-type: none"> <li>• Trauma</li> <li>• Previous infection</li> </ul>	Perforation of tympanic membrane visible with no fluid present. Hearing difficulties possible depending on size.
Otosclerosis <i>A form of bone overgrowth in the middle ear (very rare in children).</i>	Unknown	<ul style="list-style-type: none"> <li>• Gradual hearing loss</li> <li>• Tinnitus</li> <li>• Dizziness</li> </ul>


Continued on page 16

Disorder <sup>1,9</sup>	Main causes	Signs and symptoms
<b>(OM)</b>		
Acute otitis media (AOM) <i>Acute infection of the middle ear</i>	<ul style="list-style-type: none"> <li>• Cold, allergy or upper respiratory tract infection</li> </ul>	<ul style="list-style-type: none"> <li>• Earache, tugging or holding ear</li> <li>• Fever</li> <li>• Irritability</li> <li>• Redness/ bulging of eardrum</li> <li>• Discharge of pus or fluid if ruptured</li> </ul>
Otitis media with effusion (OME) <i>Presence of middle ear fluid without symptoms and signs of suppurative infection</i> <i>Often referred to as 'glue ear'</i> <i>Can be episodic (duration &lt; 3 months) or persistent (more than 3 months without any acute symptoms or signs of inflammation)<sup>7</sup></i> <small>ref</small>	<ul style="list-style-type: none"> <li>• Cold or allergy leading to blockage of Eustachian tube</li> <li>• Dysfunction of the Eustachian tube</li> <li>• Inflammation of adenoids</li> <li>• Infants drinking from a bottle laying down</li> <li>• Infection caused by pre-existent perforation via contaminated water</li> </ul>	<ul style="list-style-type: none"> <li>• Feeling of pressure</li> <li>• Blocked ear</li> <li>• Tinnitus</li> <li>• Retracted ear drum</li> <li>• Air bubbles or fluid visible</li> <li>• Hearing difficulties</li> <li>• Tugging or pulling at ear(s)</li> <li>• Loss of balance</li> <li>• Delayed speech development</li> </ul>
Suppurative otitis media (SOM) & Chronic SOM (CSOM) <i>Infection of the middle ear, with perforation of the ear drum</i> <i>Chronic if more than 6 weeks</i>	<ul style="list-style-type: none"> <li>• OM with eardrum perforation</li> <li>• Inflammation from measles or scarlet fever or tuberculosis</li> <li>• Traumatic perforation with secondary infection</li> <li>• Biofilm</li> </ul>	<ul style="list-style-type: none"> <li>• Persistent discharge of mucous and pus, sometimes foul smell</li> <li>• Eardrum perforation</li> <li>• Hearing difficulties</li> <li>• Relief from earache</li> <li>• Continuation or re-infection after antibiotic treatment</li> </ul>
<b>Inner ear disorders</b>		
Viral infection	AOM or CSOM that spreads to middle ear	<ul style="list-style-type: none"> <li>• Facial palsy</li> <li>• Dizziness, vertigo</li> <li>• Deafness</li> </ul>
Acoustic shock	Noisy machinery, loud music, explosions etc	Mild to profound hearing impairment
Trauma	Head injury or injury to the ear	Mild to profound hearing impairment
<b>Developmental issues</b>		
(Central) Auditory processing disorder <sup>16</sup> <i>Deficits in neural processing of auditory information which are not due to hearing loss.</i>	<ul style="list-style-type: none"> <li>• Genetic</li> <li>• Head injury or meningitis</li> <li>• Hearing loss /auditory deprivation</li> <li>• Recurrent OM</li> <li>• Prenatal/neonatal factors i.e. low birth weight, prematurity,</li> </ul>	<ul style="list-style-type: none"> <li>• Difficulty localising sound</li> <li>• Difficulty understanding spoken language, when in noisy backgrounds or speech is rapid.</li> <li>• Slow oral response</li> <li>• Frequent requests to repeat, often says "What?"</li> </ul>



Disorder <sup>1,9</sup>	Main causes	Signs and symptoms
	drug exposure. • May be unknown	<ul style="list-style-type: none"> <li>• Difficulty learning song/rhymes</li> <li>• Poor attention, easily distracted</li> </ul>

This document can be made available in alternative formats on request.

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