



6.4 Ear health and hearing loss among Indigenous children

Ear disease and associated hearing loss are highly prevalent among Aboriginal and Torres Strait Islander children. Hearing loss may result from genetic causes, complications at birth, certain infectious diseases, chronic ear infections, use of certain medicines, injuries and accidents, exposure to loud noise, and ageing. Worldwide, 60% of childhood hearing loss is due to preventable causes (WHO 2017).

Otitis media is the key condition contributing to hearing loss among Indigenous children, and it is treatable and preventable (Burns & Thomson 2013). Otitis media is the inflammation of the middle ear, typically caused by bacterial and viral pathogens that also cause common childhood illnesses (Burns & Thomson 2013). Infections can present themselves in various ways, including as acute infections (which can be recurrent), the presence of middle ear fluid without the usual signs of infection, or as chronic infections with persistent discharge (Kong & Coates 2009). Short-lasting mild to moderate hearing loss is common during uncomplicated otitis media (Williams & Jacob 2009). Hearing loss is greater and lengthier in chronic and complicated infections (O'Connor et al. 2009) and can become long term or permanent unless corrected by surgery. Generally, otitis media incidence is highest in children aged 6–24 months and then again in children aged 4–5 years (Burns & Thomson 2013).

The clinical presentation of otitis media infections differs for Indigenous and non-Indigenous children. Otitis media is characterised in Indigenous children by a younger age at first episode, higher frequency of infection, greater severity and greater persistence than in non-Indigenous children (Jervis-Bardy et al. 2017). Repeated ear infections, which are often undiagnosed and untreated, are substantially and significantly associated with hearing problems at a later stage (Yiengprugsawan et al. 2013). Between the ages of 2 and 20, an Indigenous child or young person is likely to experience hearing loss from middle ear infections for at least 32 months, compared with 3 months for non-Indigenous children/young people (Kong & Coates 2009).

Studies have consistently shown that ear disease is more common in Indigenous children (AIHW 2014) than in non-Indigenous children. In 2011, the rate of burden (measured using disability-adjusted life years—DALYs) from hearing loss in Indigenous children aged 0–14 was 12 times as high as for non-Indigenous children (69.4 and 5.6 DALYs per 100,000 population, respectively). Similarly, the rate of burden from otitis media in Indigenous children was 8.5 times as high as for non-Indigenous children (41.9 and 4.9 DALYs per 100,000, respectively). Several studies have found that Indigenous children living in remote areas experience higher rates of severe and persistent ear infections than their urban counterparts (AHMAC 2017).





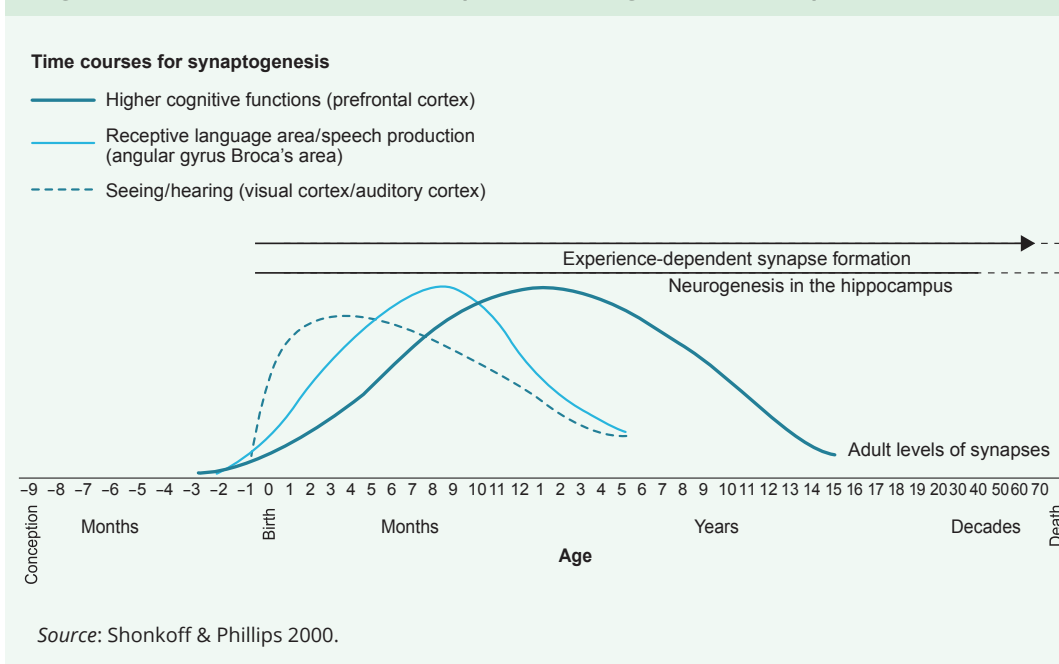
Impact of poor hearing health

Poor ear and hearing health is a serious problem, which can profoundly affect a child's life. Figure 6.4.1 shows that the key developmental period for language, vision, hearing and higher cognitive functioning occurs during the first few years of life and extends into adolescence. Higher rates of hearing loss associated with otitis media for Indigenous children aged 6–24 months and 4–5 years overlaps with this important developmental period (Burns & Thomson 2013).

Poor hearing can impede cognitive development, auditory processing skills, and speech and language development, resulting in poor attention and listening (Burns & Thomson 2013; Burrow et al. 2009; Williams & Jacob 2009). Hearing loss can also have an impact on social and emotional wellbeing. It can lead to behavioural problems, such as irritability and disobedience, which in turn, can lead to social isolation, problems with school attendance and early school-leaving (Burrow et al. 2009).

These compounding problems can lead to life-long negative social consequences for the child, as well as for their family and community—for example, limited employment options and income, increased antisocial behaviours, and increased contact with the criminal justice system (Burns & Thomson 2013; Burrow et al. 2009). Therefore, for many Indigenous children, hearing loss and its associated consequences further compound many of the disadvantages already facing Indigenous Australians.

Figure 6.4.1: Human brain development throughout the lifespan

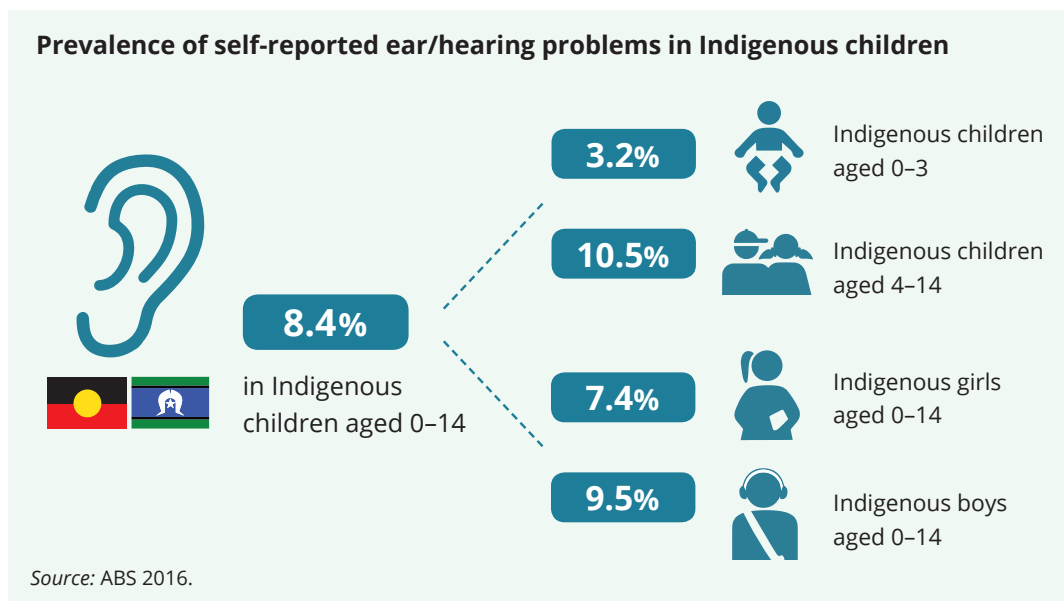




How common is poor ear health and hearing loss?

This section refers to a number of national surveys (self-reported data) described previously (AIHW 2014). Self-reported surveys are likely to underestimate hearing loss as respondents can be unaware of the extent of their own or their child's hearing loss, particularly in mild cases (AIHW 2016).

Based on self-reported data from the Australian Bureau of Statistics 2014–15 National Aboriginal and Torres Strait Islander Social Survey, the rate of long-term ear/hearing problems in Indigenous children aged 0–14 was estimated to be almost 3 times the rate for non-Indigenous children (8.4% compared with 2.9%) (ABS 2016; see also Figure 6.4.2). Among Indigenous children with ear/hearing problems, one-third had otitis media (ABS 2016). Self-reported ear/hearing problems were less common among Indigenous children aged 0–3 (3.2%) than among children aged 4–14 (10.5%), and 9.5% of Indigenous boys and 7.4% of girls reported ear/hearing problems (ABS 2016).

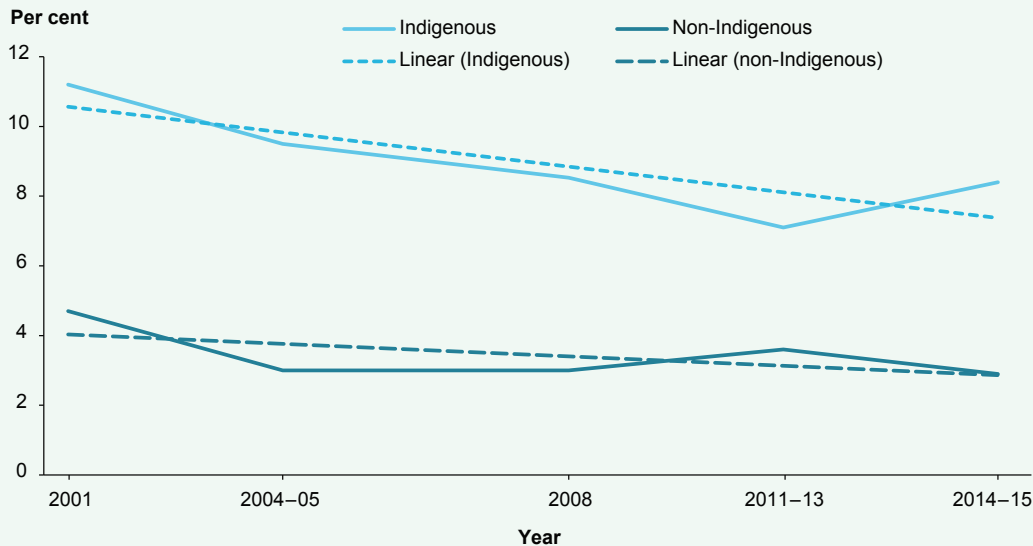


Self-reported Australian Bureau of Statistics survey data collected in 2014–15 show that fewer Indigenous and non-Indigenous children experienced long-term ear/hearing problems than in 2001.

The gap in self-reported prevalence of long-term ear/hearing problems between Indigenous and non-Indigenous children has narrowed (Figure 6.4.2). Self-reported ear/hearing problems for Indigenous children living *Remote/Very remote* areas was 18% in 2001, and 11% in 2014–15. Among Indigenous children in non-remote areas, the percentage was 11% in 2001 and 8.4% in 2014–15 (ABS 2016).



Figure 6.4.2: Children aged 0–14 with a self-reported long-term hearing problem, by Indigenous status, 2001 to 2014–15



Source: ABS 2016; Table S6.4.1.

The extent of poor ear health among Indigenous children and young people in the Northern Territory corroborated problems identified during the Child Health Check Initiative (CHCI) introduced under the Northern Territory Emergency Response (NTER). Data for the CHCI showed that between July 2007 and June 2009, of the 9,400 Indigenous children who received health checks in NTER Prescribed Areas, 30% had ear disease. In response, the Australian Government funded outreach ear and hearing services through various funding arrangements, via the National Partnership on Northern Territory Remote Aboriginal Investment (Box 6.4.1).

Box 6.4.1: Northern Territory Remote Aboriginal Investment (NTRAI) Hearing Health Program (HHP) for remote children

In 2016, of the 2,300 children and young people (aged 0–19) reached by the NTRAI HHP, nearly half (47%, 1,068) had some form of otitis media; of these children and young people, nearly three-quarters (71%, 759) had observed hearing loss. Two-thirds (65%) of all children aged 0–2 in the program had otitis media, with 53% of them having hearing loss. Fifty-nine per cent (59%) of children aged 3–5 had otitis media, with 78% of the group experiencing hearing loss (AIHW 2017b).

Data collections for the NTRAI HHP have some limitations: children and young people who receive services are not a random sample of Indigenous children in the Northern Territory, because these services target children with high need (AIHW 2017b).



Factors associated with poor hearing health

Social and economic factors

Several social and economic factors are associated with the presence of middle ear disease among Indigenous children. A study using the Australian Early Development Census (AEDC)—which examined the relationship between socioeconomic position and hearing loss in both Indigenous and non-Indigenous children—found that socioeconomic position was strongly associated with hearing loss in Indigenous children, but not in non-Indigenous children. A potential contributing factor is the higher likelihood of Indigenous children living in remote locations, which is associated with a lower socioeconomic position, and as such, decreased access to health services (Simpson et al. 2017).

Other studies have found that ear disease and hearing loss are typically found in children experiencing socioeconomic disadvantage (AHMAC 2017; Burns & Thomson 2013). Factors associated with socioeconomic disadvantage that increase the risk of otitis media for Indigenous children include premature birth, not being breastfed and nutritional deficiencies (Burns & Thomson 2013; Burrow et al. 2009; Kong & Coates 2009).

Environmental factors

Environmental factors are another key determinant of ear/hearing problems. Children are more likely to have ear/hearing problems if they have been exposed to household overcrowding, poor hygiene, and inadequate access to running water or functioning sewerage and waste removal systems (AHMAC 2017; Burns & Thomson 2013). These factors are strongly associated with remoteness (Simpson et al. 2017).

Second-hand tobacco smoke and exposure to wood smoke also contribute to increased risk of otitis media (Burns & Thomson 2013; Burrow et al. 2009). In 2014–15, 57% of Indigenous children aged 0–14 lived in households where there was at least one daily smoker. This figure decreased from 68% in 2004–05, but is still 2.7 times the rate for non-Indigenous children (21%) (ABS 2016). In 2014–15, 13% of Indigenous children lived in households in which someone smoked inside. Survey data from 2014–15 reported that 17% of Indigenous children in remote areas lived in households in which someone smoked inside, compared with 13% in non-remote areas (ABS 2016).

The 2014–15 Aboriginal and Torres Strait Islander Social Survey data were used to examine self-reported hearing loss by different social, economic and environment factors. The data show that the percentage of hearing problems among Indigenous children who lived in:

- the most socioeconomically disadvantaged households was 9.1%, compared with 6.3% among Indigenous children living in the least socioeconomically disadvantaged households
- overcrowded households was 10%, compared with 7.7% among Indigenous children living in non-crowded households
- households with a regular indoor smoker was 9.8%, compared with 8.2% among Indigenous children living in households that did not have a regular indoor smoker (ABS 2016).



Barriers to health care

Limited access to health care can result in delayed diagnosis, treatment and management of middle ear disease among Indigenous children, and therefore prolong periods of hearing loss and impairment (AIHW 2017b). Indigenous children wait longer than the recommended time to see an audiologist and/or ear, nose and throat (ENT) surgeon. Research has shown that 1 in 5 (18%) Indigenous children in rural and remote areas waited longer than the recommended period of 3 months for audiology testing (Gunasekera et al. 2009; Simpson et al. 2017).

In 2014–15, of those children with an ear/hearing problem, 83% had received treatment such as medication, surgery, or consultation with a specialist (ABS 2016). More than 1 in 4 (26%) Indigenous children who had an ear or hearing problem but did not receive treatment lived in *Remote* areas compared with 14% of children in non-remote areas (ABS 2016).

Limited access to primary health care has been associated with factors that include poor health awareness in carers (who do not know when children should receive health care), inadequate health care infrastructure in remote areas, or a lack of culturally appropriate services. Specialist care is limited in remote areas (Burns & Thompson 2013).

Department of Health guidelines recommend training of health care practitioners, together with efforts to increase awareness of clinical guidelines to ensure Indigenous children who attend primary health care are appropriately screened or treated for otitis media and hearing loss. Indigenous child health checks provide opportunity for detection, antibiotic treatment, follow-up assessment and referral to speech and audiology services. It is also important that primary health care providers are able to diagnose and treat chronic otitis media, as well as to work with audiologists and specialist ENT surgeons to manage hearing loss and to support the child and their family or carer through intensive follow-up and management (Darwin Otitis Guidelines Group et al. 2010).

Health services

Primary health care

The Bettering the Evaluation and Care of Health data collection (commonly called the BEACH data collection) is a national study of general practice activity that reports on problems managed, investigations ordered and treatments provided by those general practitioners surveyed. Between 2010 and 2015, 8.4% of all problems managed by general practitioners for children aged 0–14 were ear problems. Among this cohort, Indigenous children were 30% more likely to present for ear problems than non-Indigenous children (11% and 8.9%, respectively). For children aged 5–14, Indigenous children were less likely to present for ear problems than non-Indigenous children (5.5% compared with 7.4%) (AIHW 2017a).

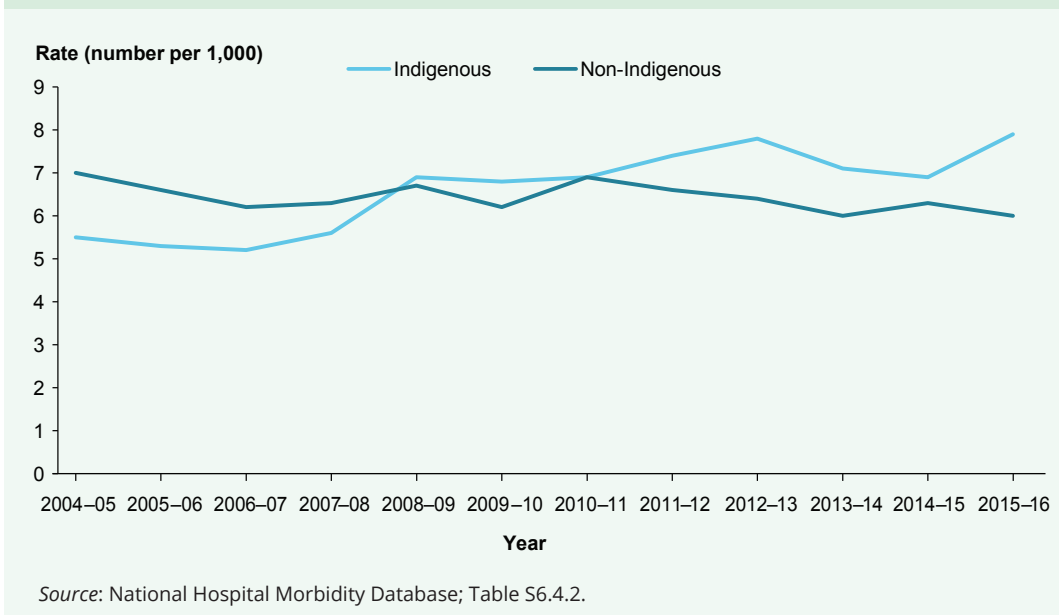


Hospitalisations

Between July 2014 and June 2016, there were nearly 3,700 hospitalisations for Indigenous children (aged 0–14) for diseases of the middle ear and mastoid process. The hospitalisation rate for Indigenous children was slightly higher than for non-Indigenous children (7.4 compared with 6.4 per 1,000, respectively). The hospitalisation rate for middle ear and mastoid process problems in non-Indigenous children has remained relatively stable since 2004–05. For Indigenous children, the rate increased after 2007–08, which coincides with the NTER, and may reflect improved diagnosis and use of ear health services (Figure 6.4.3).

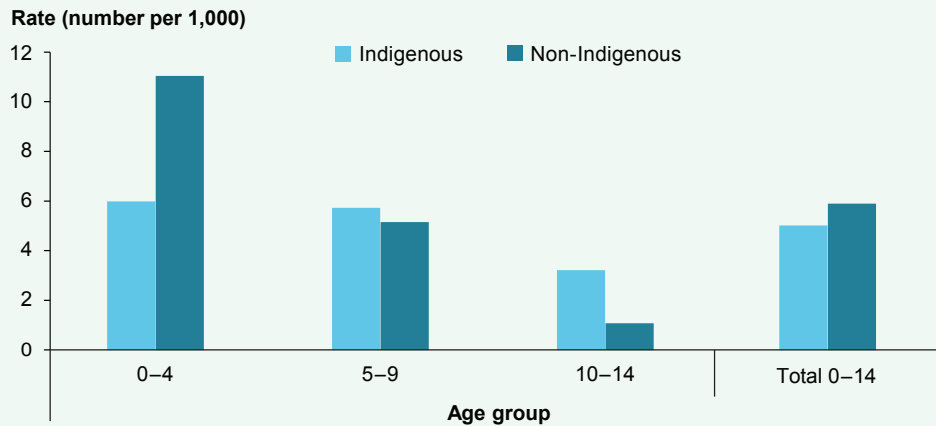
Hospitalisations for diseases of the middle ear and mastoid process reflect use of health services, rather than the prevalence of these conditions in the community.

Figure 6.4.3: Rate of hospitalisations of children aged 0–14 for diseases of the middle ear and mastoid process, by Indigenous status, 2004–05 to 2015–16



Myringotomy (incision in the eardrum to relieve pressure caused by excessive fluid build-up) and/or *tympanoplasty* (a reconstructive surgical treatment for a perforated eardrum) are common procedures associated with diseases of the middle ear and mastoid process. Of the 3,700 hospitalisations for Indigenous children with diseases of the middle ear and mastoid process, three-quarters (76%) had *myringotomy* and/or *tympanoplasty*. Between July 2014 and June 2016, the overall rate of *myringotomy* and *tympanoplasty* procedures for children aged 0–14 was similar for Indigenous children (5.6 per 1,000) and non-Indigenous children (5.7 per 1,000) (Figure 6.4.4). However, non-Indigenous children had their procedures at relatively younger ages than Indigenous children.

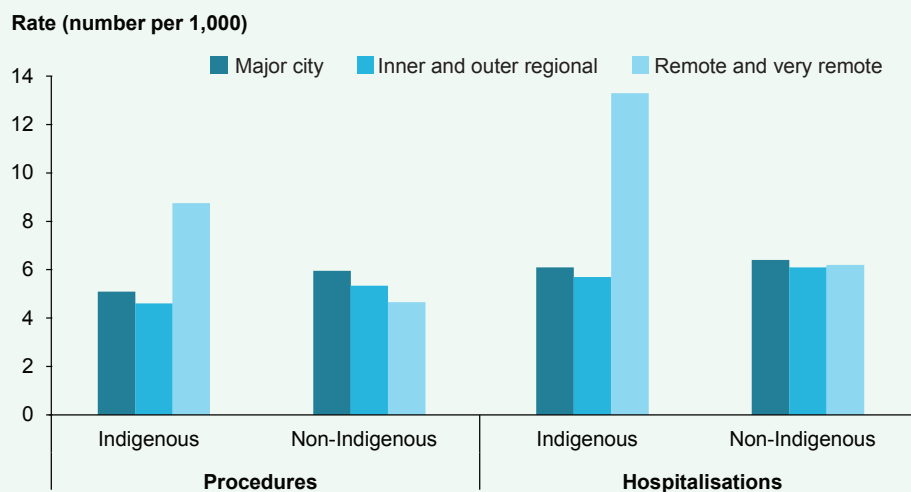
Figure 6.4.4: Rate of middle ear related procedures for diseases of the middle ear or mastoid process in children aged 0–14, by age group and Indigenous status, 2014–16



Source: National Hospital Morbidity Database; Table S6.4.3.

Non-Indigenous children in *Major cities* and regional areas were more likely to have procedures in hospital for the middle ear compared with Indigenous children living in the same remoteness areas. However, in *Remote* and *Very remote* areas, Indigenous children were almost twice as likely as non-Indigenous children to have hospital procedures for the middle ear (8.8 compared with 4.7 per 1,000 population), and 2.1 times as likely to be hospitalised for problems with the middle ear or mastoid process (13.3 compared with 6.2 per 1,000) (Figure 6.4.5). Between July 2014 and June 2016, Indigenous children were hospitalised for *tympanoplasty* procedures at 4 times the rate of non-Indigenous children.

Figure 6.4.5: Rate of middle ear related procedures and of hospitalisations for diseases of the middle ear or mastoid process for children aged 0–14, by Indigenous status and remoteness category, 2014–16



Source: National Hospital Morbidity Database; Table S6.4.4.



One in 10 (9.9%) children fitted with a hearing aid or cochlear implant in 2010 were Indigenous. This proportion is more than 2.5 times as high as that for non-Indigenous children requiring the same treatment (AIHW 2017a).

Interventions and preventive actions

The proportion of Indigenous children with poor ear health and hearing loss has fallen in the last 15 years. Over that time, a range of government prevention programs aimed at decreasing the prevalence of ear disease and hearing loss have been implemented. Effective interventions and programs include:

- antibiotic treatments
- immunisation programs against *Haemophilus influenzae* type b (Hib) and *Streptococcus pneumoniae*, which help to reduce the number of otitis media episodes
- neonatal screening for early identification of congenital malformations and early intervention, enabling timely treatment and management
- routine child health checks that incorporate ear and hearing assessments, allowing for early identification, management and treatment and, if necessary, the fitting of hearing aids
- case management models of service delivery where a coordinator administers clinical care, and links children with specialist and community health services
- greater access to surgical ENT care, which involves greater coordination nationally of available resources
- Indigenous-specific clinical guidelines, which provide the basis for better management of ear disease and resultant hearing loss
- targeted screening and treatment services for ear health and hearing loss through programs such as the national Healthy Ears, Better Hearing, Better Listening Program and the hearing health element of the National Partnership on NTRAI (see Box 6.4.2) (AIHW 2014).

As well as medical interventions, attention should be given to dealing with social and economic challenges, including education strategies to combat hearing loss related to otitis media (Burrow et al. 2009). These efforts must involve the child's family, maternal and child health care providers, and be embedded in coordinated primary care systems (AIHW 2014).

Box 6.4.2: NTRAI HHP: impact of intervention

The NTRAI HHP (see also Box 6.4.1) provides outreach ear and hearing services to high-risk Indigenous children and young people in remote parts of the Northern Territory. These services have four components—health promotion and prevention, audiology services, Clinical Nurse Specialists, and ENT teleotology services (where a clinical examination, including digital imaging of the ear, is performed and reviewed later or remotely by a specialist).

As a result of this program, hearing health and prevalence ear conditions in this population group have improved. In December 2016, compared with July 2012, the proportion of children with at least one ear disease decreased by 15%, and the proportion of children with hearing loss decreased by 10%. Of the children who moved through the HHP over time, 51% had improved hearing loss and 62% had improved hearing impairment.



What is missing from the picture?

There is no national statistical profile of ear disease and associated hearing loss among Indigenous children using diagnostic assessment. National data are lacking on the extent of management and treatment of otitis media and other ear problems in primary health care. Without good-quality surveillance, it is difficult to understand the size and key determinants associated with the hearing problem.

The 2018–19 National Aboriginal and Torres Strait Islander Survey (NATSIHS) will include a hearing test, which will supplement data already collected in the NATSIHS on self-reported hearing loss. This aims to provide a national picture on hearing loss in Indigenous Australians but will not provide information about its causes. This survey does not sample non-Indigenous Australians.

Further work could be done to investigate the link between hearing health data (collected since 2007 as part of the CHCI in the Northern Territory) and vulnerability (using the AEDC) and educational outcomes using the National Assessment Program—Literacy and Numeracy data.

Where do I go for more information?

More information about hearing health in Indigenous children can be found in:

- Australian Health Ministers' Advisory Council's *Aboriginal and Torres Strait Islander Health Performance Framework 2017 report* <www.pmc.gov.au/sites/default/files/publications/indigenous/hpf-2017>.
- AIHW's *Northern Territory Remote Aboriginal Investment: Ear and Hearing Health Program—July 2012 to June 2016* <www.aihw.gov.au/reports/indigenous-health-welfare-services/nt-ear-hearing-program-to-2016/related-material>.
- AIHW's *Aboriginal and Torres Strait Islander Health Performance Framework 2017: supplementary online tables* <www.aihw.gov.au/reports/indigenous-health-welfare/health-performance-framework-report/data>.
- Australian Medical Association's *2017 Report card on Indigenous health—a national strategic approach to ending chronic otitis media and its lifelong impacts in Indigenous communities* <www.ama.com.au/system/tdf/documents/2017%20Report%20Card%20on%20Indigenous%20Health.pdf?file=1&type=node&id=47575>.

References

- ABS (Australian Bureau of Statistics) 2016. National Aboriginal and Torres Strait Islander Social Survey, 2014–15. ABS cat. no. 4714.0. Canberra: ABS.
- AHMAC (Australian Health Ministers' Advisory Council) 2017. Aboriginal and Torres Strait Islander Health Performance Framework 2017 report. Canberra: AHMAC.
- AIHW (Australian Institute of Health and Welfare) 2014. Ear disease in Aboriginal and Torres Strait Islander children. Resource sheet no. 35 produced by the Closing the Gap Clearinghouse. Canberra: AIHW.
- AIHW 2016. Australian Burden of Disease Study: impact and causes of illness and death in Aboriginal and Torres Strait Islander people 2011. Australian Burden of Disease Study series no. 6. Cat. no. BOD 7. Canberra: AIHW.
- AIHW 2017a. Aboriginal and Torres Strait Islander Health Performance Framework 2017: supplementary online tables. Cat. no. WEB 170. Canberra: AIHW.



AIHW 2017b. Northern Territory Remote Aboriginal Investment: Ear and Hearing Health Program—July 2012 to June 2016. Cat. no. IHW 176. Canberra: AIHW.

Burns J & Thomson N 2013. Review of ear health and hearing among Indigenous Australians. Perth: Edith Cowan University. Australian Indigenous Health *InfoNet*. Viewed on 5 December 2017, <<http://www.healthinfonet.ecu.edu.au/other-health-conditions/ear/reviews/our-review>>.

Burrow S, Galloway A & Weissföner N 2009. Review of educational and other approaches to hearing loss among Indigenous people. Perth: Edith Cowan University. Australian Indigenous Health *InfoNet*. Viewed on 5 December 2017, <<http://www.healthinfonet.ecu.edu.au/other-health-conditions/ear/reviews/our-review-education>>.

Darwin Otitis Guidelines Group & Office for Aboriginal and Torres Strait Islander Health Otitis Media Technical Advisory Group 2010. Recommendations for clinical care guidelines on the management of otitis media in Aboriginal and Torres Strait Islander populations. Canberra: Department of Health. Viewed on 30 January 2018, <[www.health.gov.au/internet/main/publishing.nsf/Content/B8A6602C7714B46FCA257EC300837185/\\$File/Recommendation-for-clinical-guidelines-Otitis-Media.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/B8A6602C7714B46FCA257EC300837185/$File/Recommendation-for-clinical-guidelines-Otitis-Media.pdf)>.

Gunasekera H, Morris PS, McIntyre P & Craig JC 2009. Management of children with otitis media: a summary of evidence from recent systematic reviews. *Journal of Paediatrics and Child Health* 45(10):554–63.

Jervis-Bardy J, Carney AS, Duguid R & Leach AJ 2017. Microbiology of otitis media in Indigenous Australian children. *The Journal of Laryngology & Otology* 131(S2):S2–11.

Kong K & Coates HLC 2009. Natural history, definitions, risk factors and burden of otitis media. *The Medical Journal of Australia* 191(9 Suppl):S39.

O'Connor TE, Perry CF & Lannigan FJ 2009. Complications of otitis media in Indigenous and non-Indigenous children. *The Medical Journal of Australia* 191(9 Suppl):S60.

Shonkoff JP & Phillips D 2000. From neurons to neighborhoods: the science of early childhood development. Committee on Integrating the Science of Early Childhood Development. Washington DC: National Academy Press.

Simpson A, Enticott JC & Douglas J 2017. Socioeconomic status as a factor in Indigenous and non-Indigenous children with hearing loss: analysis of national survey data. *Australian Journal of Primary Health* 23(2):202–7.

WHO (World Health Organization) 2017. Deafness and hearing loss fact sheet. Geneva: WHO. Viewed on 5 December 2017, <<http://www.who.int/mediacentre/factsheets/fs300/en/>>.

Williams CJ & Jacobs AM 2009. The impact of otitis media on cognitive and educational outcomes. *The Medical Journal of Australia* 191(9 Suppl):S39.

Yiengprugsawan V, Hogan A & Strazdins L 2013. Longitudinal analysis of ear infection and hearing impairment: findings from 6-year prospective cohorts of Australian children. *BioMed Central (BMC) Pediatrics* 13(1):28.