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AIHW

Hearing health outreach services for Aboriginal and Torres Strait Islander children in the Northern Territory

July 2012 to
December 2023



The AIHW is a corporate Commonwealth entity producing authoritative and accessible information and statistics to inform and support better policy and service delivery decisions, leading to better health and wellbeing.

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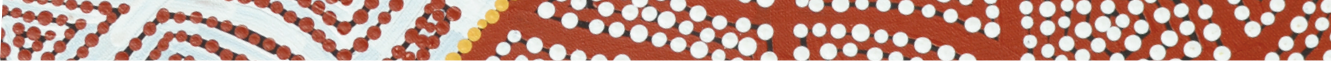
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Summary

Ear and hearing health is vital for overall health and quality of life. Ear disease and associated hearing loss can have long-lasting impacts on education, wellbeing and employment.

Aboriginal and Torres Strait Islander (First Nations) children are more likely than non-Indigenous children to experience ear and hearing problems. Several factors contribute to the poorer ear and hearing health of First Nations children, including lack of access to health services, household overcrowding and second-hand smoke exposure.

Since 2012, the Australian Government has funded the Northern Territory Government to deliver hearing health outreach services to First Nations children and young people aged under 21 in the Northern Territory—mainly through the National Partnership on Northern Territory Remote Aboriginal Investment (for children aged under 16); and through the Healthy Ears—Better Hearing, Better Listening Program (for children and young people aged under 21). These outreach services include audiology services, ear, nose and throat (ENT) services, and Clinical Nurse Specialist (CNS) services.

This report presents new data for hearing health outreach services provided in 2023, through Northern Territory Remote Aboriginal Investment, the Healthy Ears—Better Hearing, Better Listening Program (until 30 June 2022) and other Australian Government funded programs and includes time trends for the period July 2012 to December 2023.

How many children received services?

- In 2023, 171 training sessions for hearing health education, promotion and prevention activities were provided to health-care staff.
- A total of 2,067 First Nations children and young people received at least 1 audiology, Clinical Nurse Specialist (CNS), or ear, nose and throat (ENT) teleotology service in 2023. From July 2012 to December 2023, a total of 45,491 CNS, audiology and teleotology services were provided to more than 11,000 children and young people.
- In 2023, 2,343 outreach audiology services were provided to 2,057 First Nations children and young people. From July 2012 to December 2023, a total of 25,139 audiology services were provided to 10,900 children and young people.
- 724 ENT teleotology services were provided to 646 First Nations children and young people in 2023. From July 2012 to December 2023, a total of 9,538 teleotology services were provided to 4,560 children and young people.
- In 2023, CNSs conducted 1,165 visits to 1,060 children. From July 2012 to December 2023, a total of 10,814 CNS services were provided to about 6,600 First Nations children.

Figure 1: Number of First Nations children and young people who received audiology, CNS or ENT teleotology service in 2023



2,057

children and young people received **audiology** services



1,060

children and young people received **CNS** services



646

children and young people received **ENT teleotology** services

Sources: Tables S2.1, S2.3 and S2.5.

Hearing health is improving among children and young people who received outreach services between 2012 and 2023.

The percentage of First Nations children and young people with at least 1 ear condition decreased by 13 percentage points, from 66% (483 of 727 children and young people) to 54% (1,108 of 2,067 children and young people).

Among children and young people who received audiology services, the proportion with hearing loss decreased by 20 percentage points, from 55% (388 of 710 children and young people) to 34% (707 of 2,057 children and young people).

Figure 2: Ear and hearing health improvements between 2012 and 2023

66%



54%

Children and young people with at least 1 **ear condition**



55%

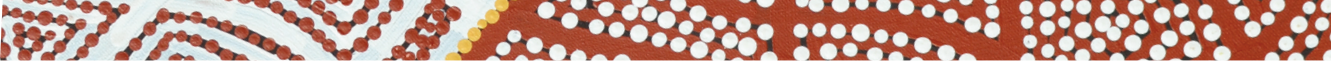


34%

Children and young people with **hearing loss**

Sources: Tables S3.1 and S3.6.

Among 5,191 First Nations children and young people who received at least 2 audiology services between 2012 and 2023, 3,525 had hearing loss at their first service, and of those, 2,350 (67%) had improved—this is a change from bilateral to unilateral hearing loss or from unilateral hearing loss to no hearing loss.



Between 2012 and 2023, among 2,233 First Nations children who received at least 2 audiology services and had hearing impairment at their first service, 1,685 (76%) had improved—moving to a lower degree of hearing impairment or to no hearing impairment.

Many children and young people are still waiting for hearing health services

At December 2023, there were 3,118 First Nations children and young people on the audiology waiting list. Among them, 1,681 were new referrals and 1,437 were recalled for further follow-up after receiving an initial audiology service. There were 2,128 children and young people on the waiting list for ENT teleotology services. Among them, 797 were new referrals and 1,331 were recalled for further follow-up after receiving initial ENT teleotology services.

Is the Hearing Health Program meeting its benchmarks?

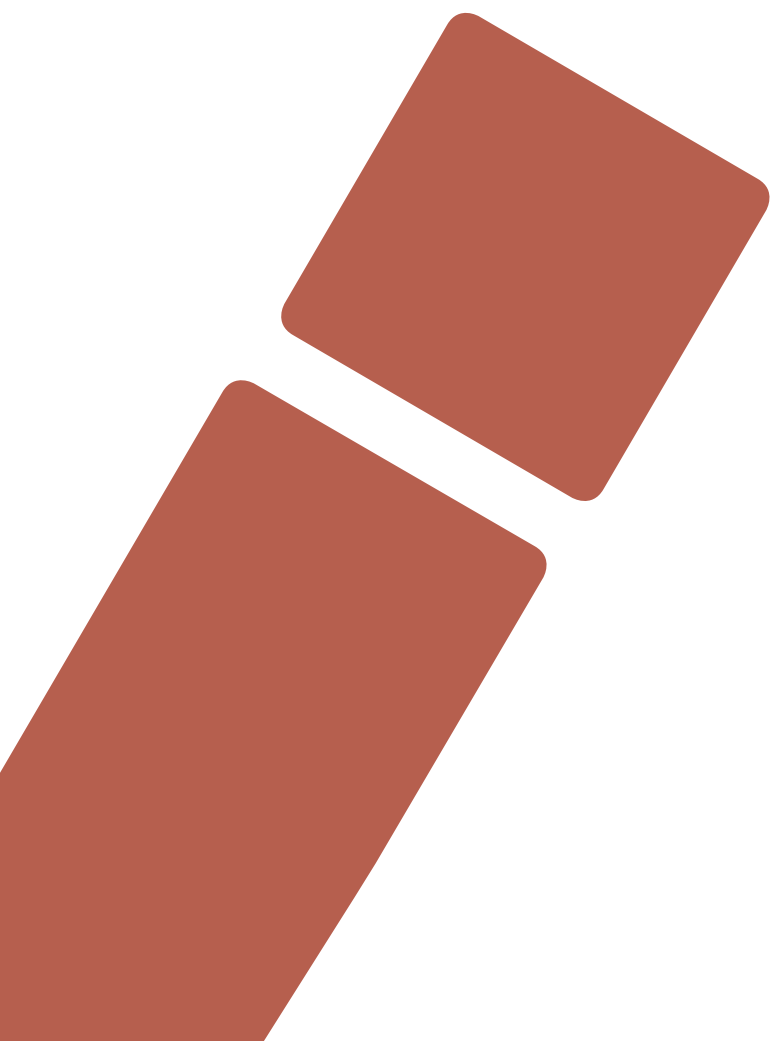
Service delivery benchmarks for hearing health are set in the Northern Territory Remote Aboriginal Investment (NTRAI) Health Implementation Plan for audiology, CNS and health promotion and training activities. These are measured by the number of services per year. In 2023, all 3 service delivery targets were exceeded.

Progress against benchmarks is presented in Table 1.

Table 1: Progress against benchmarks, 2023

Target	Outcome
Service delivery targets	
At least 1,700 audiology services per year	2,343 audiology services provided in 2023
At least 700 children receiving CNS services per year	1,060 children received CNS services in 2023
At least 15 hearing health promotion or training services/activities per quarter (60 per year)	171 hearing health promotion or training services and activities provided in 2023

CNS = Clinical Nurse Specialist.





1

Introduction

Why is ear and hearing health important?

Hearing loss is more prevalent among First Nations people than among non-Indigenous Australians, and continues to be an important health and social issue. In 2018–19, First Nations children aged 0–14 were twice as likely to report a long-term ear/hearing problem than non-Indigenous children, and 3 times as likely to report otitis media (AIHW 2020, based on data from ABS health surveys).

What is ear and hearing health?

‘Ear and hearing health’ can refer to a variety of ear-related conditions, hearing impairment, hearing loss, and the relationship between these health problems. ‘Hearing loss’ involves loss of hearing in one or both ears, and ‘hearing impairment’ describes the degree of impairment associated with hearing loss in the ‘better hearing ear’.

‘Middle ear disease’ includes conditions such as otitis media and its various forms. Otitis media refers to all forms of inflammation of the middle ear and can commonly be caused by infection or Eustachian tube dysfunction (ETD). The Eustachian tube functions to equalise the pressure in the middle ear to atmospheric pressure and impairment of this function is known as Eustachian tube dysfunction. Eustachian tube function can be impaired for a number of reasons, most commonly occurring in childhood when the Eustachian tube is developing. Enlarged adenoids (glands in the roof of the mouth) are often present.

Impact of poor ear and hearing health

Among First Nations children, otitis media is a large contributor to hearing loss, and often manifests itself at earlier ages, with greater severity, greater persistence and more frequently than in non-Indigenous children (Jervis-Bardy et al. 2014).

Hearing loss can also have severe negative impacts on language development, cognitive development and socialisation, particularly in infants and young children. Hearing loss in early childhood can lead to social, learning, linguistic and behavioural problems in school. Experiencing these difficulties can translate into a lifetime of disadvantage, affecting areas such as wellbeing, social success, income, and employment (WHO 2021).

Ear and hearing health in the Northern Territory

Middle ear disease is a common health problem and is a cause for concern among First Nations children, particularly those who live in remote communities (ABS 2016). This may be associated with several factors, including:

- the nature of otitis media, which makes it a complicated disease to manage
- the acceptance in many communities of otitis media as normal because it is common

- living conditions in some parts of the Northern Territory—for example, inadequate housing, household overcrowding and related hygiene issues
- breastfeeding practices, hygiene in daycare centres and second-hand smoke exposure
- delays in treatment due to the inability to find children in communities during outreach visits because of the high mobility of First Nations families
- the vast geographical spread of First Nations communities, which makes access to services difficult
- the difficulty in recruiting and retaining a specialist workforce
- challenges experienced by the health sector to improve systemic issues with delivery of culturally appropriate health care and unconscious bias.

Living in remote areas may affect access to general and ear health services: there are fewer medical practitioners per capita, and less access to general practitioners (AIHW 2014a, 2014b). Decreased access to these services can result in delays in diagnosis, treatment and management of middle ear disease among First Nations children, prolonging periods of hearing loss and impairment.

Australian Government-funded Hearing Health Program in the Northern Territory

Hearing health services were expanded in the Northern Territory in response to the Child Health Check Initiative (CHCI) in July 2007, which was introduced under the Northern Territory Emergency Response (NTER). The original Child Health Check data for the 9,373 First Nations children who received services in the NTER Prescribed Areas showed that between July 2007 and June 2009, 30% had ear disease. Through the introduction of the CHCI, the children who were found to have ear diseases were able to obtain audiology, and ear, nose and throat (ENT) specialist services (AIHW & DoHA 2009).

The program continued under the Closing the Gap initiative (CtG) in the Northern Territory National Partnership Agreement from mid-2009 to mid-2012. More information can be found in the 2012 AIHW publication *Northern Territory Emergency Response Child Health Check Initiative—follow-up services for oral and ear health: final report 2007–2012* (AIHW 2012).

Between July 2012 and June 2015, the ear and hearing health services were replaced and expanded by the National Partnership Agreement on Stronger Futures in the Northern Territory (SFNT). Since July 2015, these services have been continued through the National Partnership on Northern Territory Remote Aboriginal Investment (NTRAI).

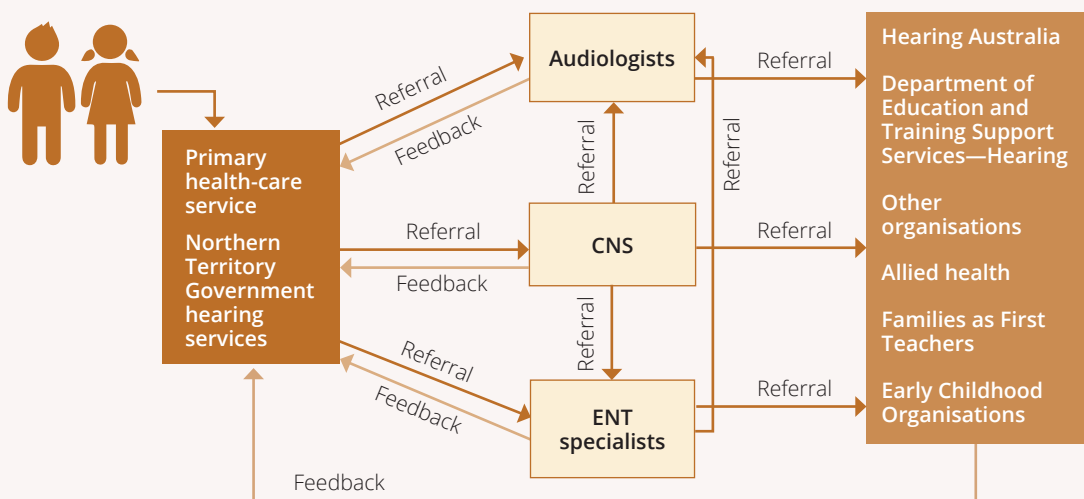
Until 30 June 2022, the Australian Government also funded the Northern Territory Government to deliver services through the Healthy Ears–Better Hearing, Better Listening Program. The Northern Territory Government used this funding to support ENT teleotology services that are part of the hearing health outreach services. From 1 July 2022, the Northern Territory Government continued to deliver these services. The teleotology services are for children and young people aged under 21, especially in remote areas where there is high demand and lack of local services. The hearing health outreach services mentioned throughout this report refer to all of the Australian Government-funded programs that stemmed from the CHCI in the Northern Territory since July 2007.

How do children and young people move through the Northern Territory hearing health system?

The hearing health outreach services are available to all First Nations children and young people aged under 21 in the Northern Territory. In 2023, there were an estimated 29,614 First Nations people aged under 21 in the Northern Territory (ABS 2024).

As illustrated in Figure 1.1, children and young people generally enter the Northern Territory public hearing health system through the primary health-care sector. Children are also monitored through the Northern Territory Government hearing health program. From this starting point, referrals can be made to audiologists, ENT specialists or CNS services. CNS services can also provide referrals to audiologists, or to other organisations. After children have been seen by audiologists or ENT specialists, they can be sent for follow-up in primary care, referred to other community-based support organisations, or referred to visiting rehabilitation support services through Hearing Australia or the Northern Territory Department of Education and Training’s Hearing Support Services.

Figure 1.1: Clinical path of children and young people moving through the Northern Territory public hearing health system



About this report

This report presents information from July 2012 to December 2023 on hearing health outreach services provided to the First Nations children and young people aged under 21 in the Northern Territory.

This report includes detailed information on 4 services provided by the Northern Territory Hearing Services (see Chapter 2):

1. Health education, promotion and prevention
2. Outreach audiology
3. ENT teleotology
4. Clinical Nurse Specialists (CNS) – Case Management and Health Promotion.

The Australian Government funds these services via various programs, and the Northern Territory Government delivers them. These programs aim to provide outreach services for the early detection, treatment and management of ear diseases and hearing health problems among First Nations children and young people.


This report is an update of *Hearing health outreach services for Aboriginal and Torres Strait Islander children in the Northern Territory: July 2012 to December 2022*, which is part of the Australian Institute of Health and Welfare's (AIHW) publication series reporting on the hearing programs in the Northern Territory. Throughout this report, supplementary tables are referenced using the prefix 'S' (for example, Table S2.1). These supplementary tables are available at <https://www.aihw.gov.au/reports/indigenous-australians/hearing-health-services-first-nations-children-nt/summary>.

About the data in this report

The data used in this report are collected from the hearing health outreach services funded by the Department of Health. The data refer to more than 11,000 First Nations children and young people aged under 21 who received services between July 2012 and December 2023. This accounts for approximately 37% of the Northern Territory First Nations population in this age group.

However, children and young people who received these services are not a random sample of the population. Audiology services were provided to children and young people in remote communities during visits from audiologists and specialists. Since January 2013, children and young people have been prioritised according to their need for services, which means that those with identified ear and hearing health issues are more likely to be captured in the data collection.

While the services under the NTRAI hearing health program are available for children and young people aged 0–15, the data in this report include a small number of service recipients aged 21 in the outreach audiology data collection who attended follow-up



services. Service recipients aged 21 are included in the totals where relevant. Data disaggregated by age groups relate to service recipients aged under 21.

See Appendix A for more information about the hearing health program data collections. See Appendix B for information on data quality statements.

Structure of the report

- **Chapter 1** presents the importance of ear and hearing health and the ear and hearing health in the Northern Territory.
- **Chapter 2** provides information about hearing health outreach services for Aboriginal and Torres Strait Islander children in the Northern Territory.
- **Chapter 3** presents ear conditions and hearing health status of Aboriginal and Torres Strait Islander children in the programs.
- **Chapter 4** provides information on demand for ear and hearing health services and other follow-up services in the programs.
- **Chapter 5** provides detailed regional analysis.
- **Chapter 6** provides evaluations on whether the program met its benchmarks.
- **Appendix A** provides information about the Hearing Health Program data collection.
- **Appendix B** provides information on data quality statements for Outreach audiology data collection, ENT teleotology data collection, CNS data collection and Child Health Check Initiative (CHCI) data collection.



2

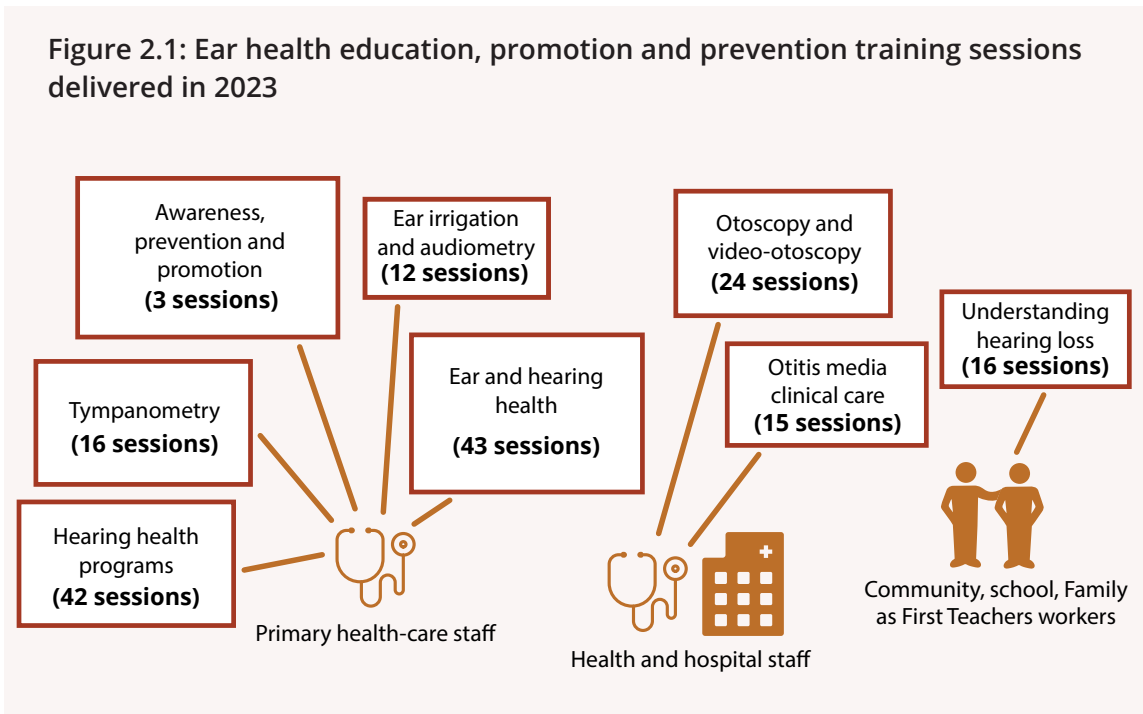
Service delivery

Health education, promotion and prevention

A variety of hearing health education, promotion and prevention activities are delivered through the Northern Territory public hearing health system. Priority areas of promotion and prevention centre on enhancing hearing health literacy through education and community participation. Health education, promotion and prevention initiatives include:

- training for First Nations people community hearing workers—including to prevent primary infection
- ear health promotion material such as handouts, posters and audiovisual messages
- development of various health promotion videos with key ear and hearing health messages and medication compliance, and a health education video with key messages regarding surgical intervention for grommet insertion.

In 2023, 171 training sessions for hearing health education, promotion and prevention activities were provided to health-care staff. The target audiences for these activities are illustrated in Figure 2.1.



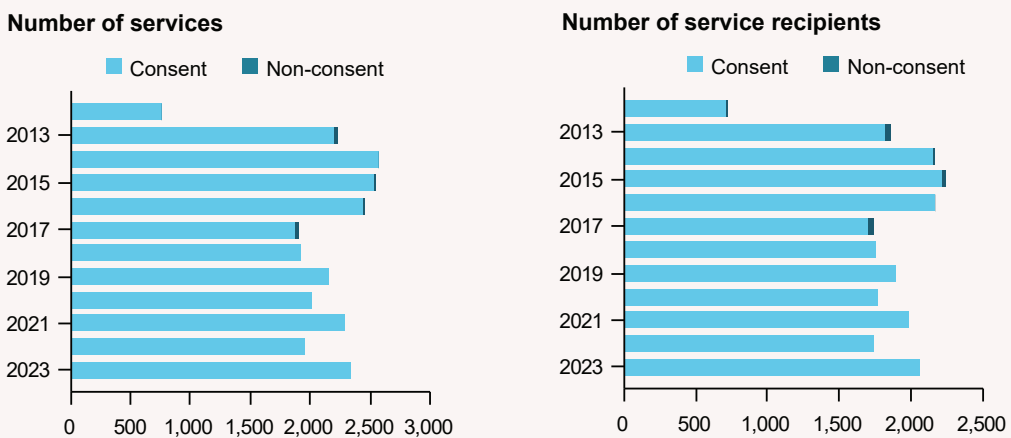
Outreach audiology

Audiology services include assessing middle ear function, diagnosing hearing loss and middle ear disease, and recommending clinical care or rehabilitation (such as communication strategies, classroom amplification, hearing aids, speech therapy and educational support). These services are delivered by audiology outreach teams, which consist of an audiologist and at least one other member of staff such as a registered nurse or First Nations health practitioner.

Consent to share information with the AIHW is required from parents or guardians of service recipients. The demographic information in this report, apart from the number of services and service recipients, represents only children who have provided consent to share their information. When a child’s parent or guardian does not provide consent to share information, only a limited amount of aggregate information is provided to AIHW. See Appendix A and Appendix B for more information.

- In 2023, 2,343 audiology services were provided to 2,057 service recipients (Figure 2.2).
- From July 2012 to December 2023, a total of 25,139 services were provided to 10,894 service recipients.
- The numbers of audiology services and service recipients increased in 2023.

Figure 2.2: Number of outreach audiology services and service recipients, July 2012 to December 2023



Notes

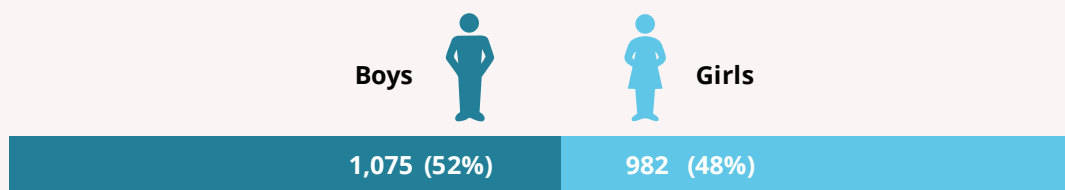
1. The total number of service recipients in July 2012 to December 2023 combined does not sum to the calendar years because some children and young people received services in multiple calendar years; these services recipients were counted only once in the total.
2. Data include service recipients aged 21 who attended follow-up services.
3. Data from 2012 to 2019 for audiology services and service recipients may differ from previous reports as a result of revisions and improvements in the audiology data collection.

Source: Table S2.1.

Generally, rates of non-consent to share information for audiology services are low, and from 2018 to 2023 there were no cases of non-consent for audiology service recipients.

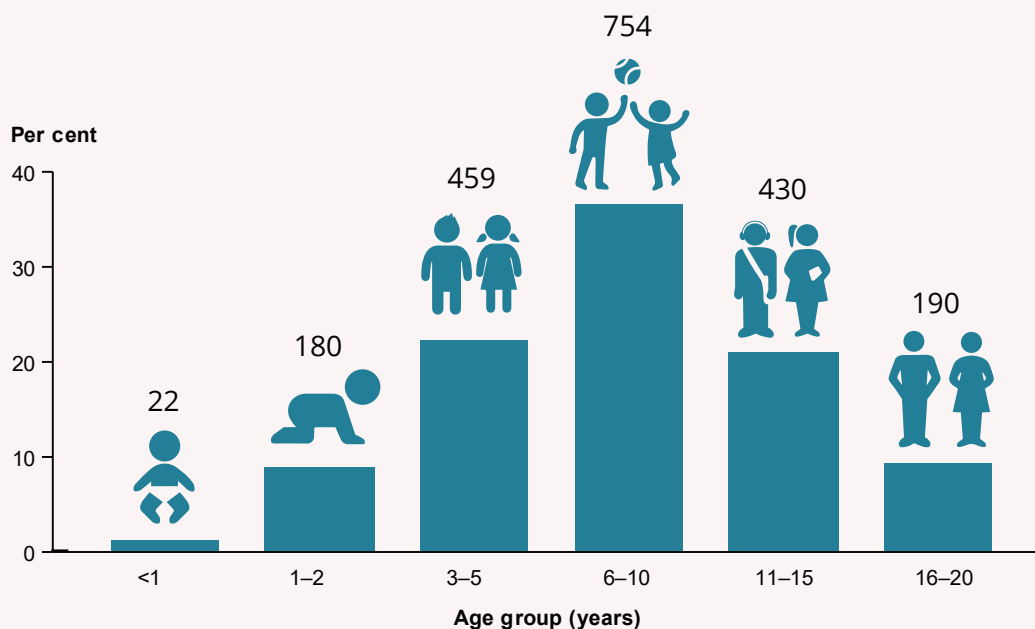
In 2023, a slightly higher number of boys received audiology services than girls (1,075 and 982, respectively) (Figure 2.3).

Figure 2.3: Outreach audiology service recipients in 2023, by sex



The percentage of service recipients varied across age groups in 2023. The highest percentage was among recipients aged 6–10 years (37%), while the lowest was for those under 1 year (1.1%), with only 22 cases represented (Figure 2.4).

Figure 2.4: Age of outreach audiology service recipients in 2023



Source: Table S2.2.

More information on outreach audiology services, such as services recommended by audiologists, can be found in the supplementary data tables online.

ENT teleotology services

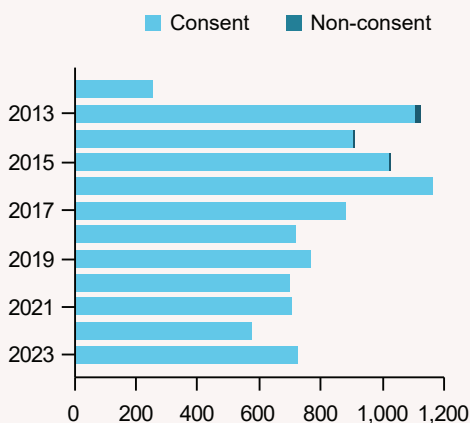
The ENT teleotology service model was developed to meet the demand for ENT services in remote Northern Territory communities. An outreach visit from an audiologist and ENT nurse provides both hearing and full clinical assessments. Video-otoscopy is performed and video sequences, clinical history and current treatment and management pathways are sent to the ENT Specialist at Royal Darwin Hospital and Alice Springs Hospital through a store and forward telemedicine model. Using the video sequences and clinical data, the ENT specialist provides advice, diagnosis, assessment and treatment recommendations (for example, medications, care coordination, surgery, hearing aids).

The availability of teleotology services in remote communities ensures that services are culturally safe and cost-effective, and eliminates time that families would otherwise have to be away from the community for specialist appointments. These services also increase access to ENT services for children and reduce the burden on tertiary centres where demand for ENT services is high.

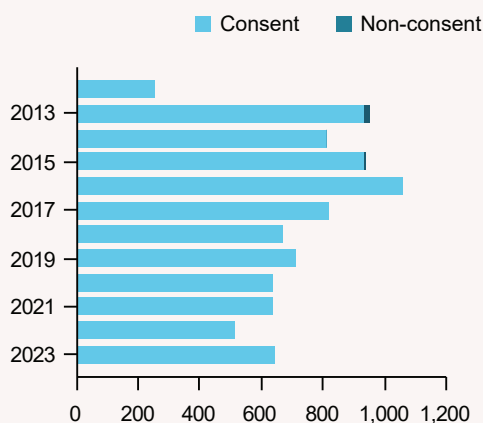
- In 2023, 724 ENT teleotology services were provided to 646 service recipients (Figure 2.5).
- From July 2012 to December 2023, a total of 9,538 services were provided to 4,560 service recipients.

Figure 2.5: Number of ENT teleotology services and service recipients, July 2012 to December 2023

Number of services



Number of service recipients



Note: The total number of service recipients in July 2012 to December 2023 combined does not sum to the years because some children and young people received services in multiple calendar years; these services recipients were counted only once in the total

Source: Table S2.3.

Rates of non-consent to share the information have been very low, and from 2016 to 2023, there were no instances of non-consent.

In 2023, the number of service recipients who were girls was slightly lower than the proportion who were boys (312 compared with 334) (Figure 2.6).

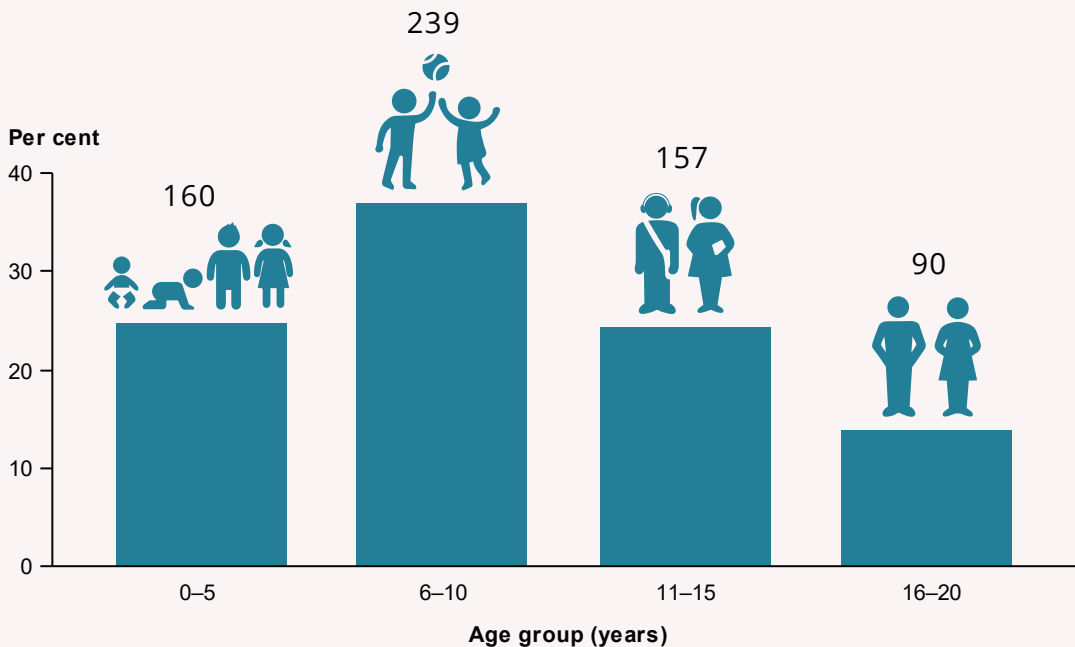
Figure 2.6: ENT teleotology service recipients in 2023, by sex



Source: Table S2.4.

Among service recipients in 2023, the highest proportion (37%) were aged 6–10 years, while the lowest was for those aged 16–20 years (14%), with 90 cases represented (Figure 2.7).

Figure 2.7: ENT teleotology service recipients in 2023, by age group



Source: Table S2.4.

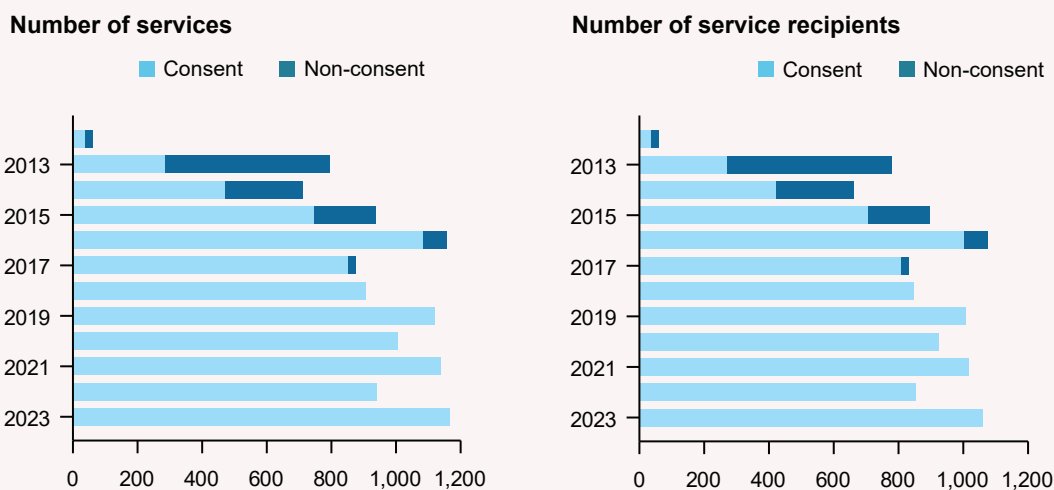
More information on ENT services, such as services recommended by ENT specialists, can be found in the data tables online.

Clinical Nurse Specialist services

CNS services were developed in response to the challenges encountered in preventing ear disease and implementing clinical care for otitis media in the Northern Territory. The CNS is responsible for early identification and case management of high priority 0–5 year old children. The CNS oversees and coordinates the treatment, management and coordination of children with a prioritised need for care by acting as a central point of contact between primary health-care services and specialist resources.

- In 2023, 1,165 CNS services were provided to 1,060 service recipients (Figure 2.8).
- From July 2012 to December 2023, a total of 10,814 services have been provided to 6,619 service recipients.
- The numbers of CNS services and service recipients increased in 2023 from the fall in 2022.

Figure 2.8: Number of CNS services and service recipients, July 2012 to December 2023



Notes

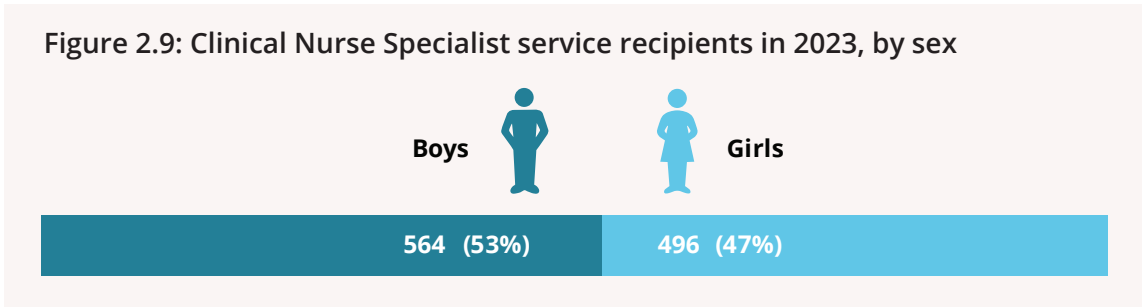
1. The total number of service recipients in July 2012 to December 2023 combined does not sum to the years because some children and young people received services in multiple calendar years; these services recipients were counted only once in the total.
2. Number of CNS services and service recipients relate to children aged 0-15.

Source: Table S2.5.

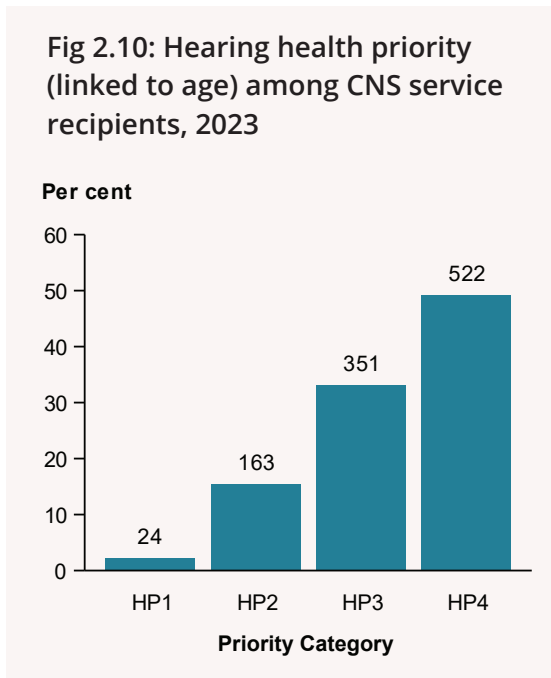
Caution should be taken when interpreting CNS data in 2013 and 2014 because non-consent rates for sharing information were high. However, non-consent rates have been decreasing over time. In 2015, the hearing health team in the Northern Territory Department of Health implemented a training program to improve consent rates, and this may explain the decrease in non-consent rates over time. In recognition of the rates of non-consent, from 2015 the Northern Territory Department of Health have ensured that staff are skilled in obtaining consent in a simple and concise way and that this is built into

the clinical workflow. This focus is reflected with a zero rate of non-consent from 2016 onwards.

Slightly more boys than girls received CNS services in 2023 (564 compared with 496) (Figure 2.9).



The CNS services are available to First Nations children who have been assigned to a hearing health priority group (Figure 2.10)—priority is closely linked to age (see Box 2.1). Under the program children are automatically prioritised into appropriate categories.



Box 2.1: Hearing health priority (HP) categories

HP1: Infants <12 months with recurrent acute otitis media (AOM) or chronic suppurative otitis media (CSOM). Infants who have failed newborn hearing screening.

HP2: Children aged 1–2 with perforation of the eardrum, recurrent AOM or persistent bilateral otitis media with effusion (OME).

HP3: Children aged 3–5 with perforation of the eardrum, recurrent AOM, persistent bilateral OME or moderate to profound hearing impairment.

HP4: Children aged 6–10 with moderate, severe or profound hearing impairment.

Older children represented the majority of CNS service recipients in 2023: 4 in 5 children (82%) were aged 3–10, with younger age groups representing a smaller proportion of service recipients. Younger children represent a small portion of children reviewed for several reasons—the difficulty in assessing them (especially under 6 months); availability of appropriate audiology equipment to assess them; difficulty in locating some children as they do not attend school and may not attend other regular services.

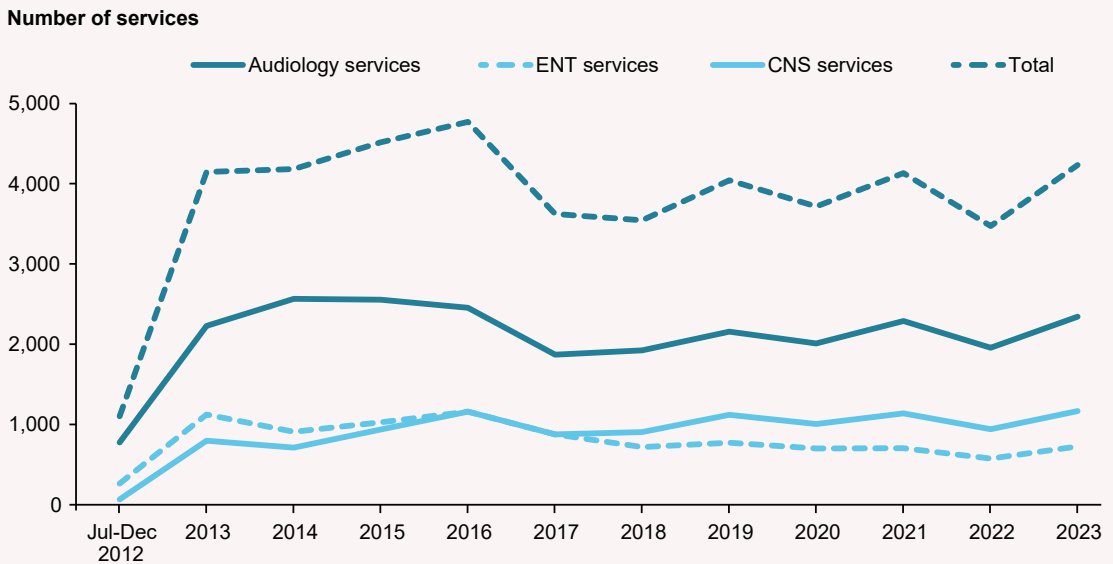
More information on CNS services can be found in the data tables (S2.5 and S2.6).

Trends

Early 2020 saw the emergence of a global pandemic of the novel coronavirus disease COVID-19. Restrictions imposed by the Australian and state and territory governments limited people’s movement and activities to limit the spread of the disease, and many people changed their behaviour to protect themselves and others from the risk of exposure.

To 2016, the number of services were relatively steady for audiology, and increasing for ENT and CNS. However, in 2017, there were decreases across all 3 service types—largely due to shortages of available specialists to provide services in remote communities (AIHW 2018). Between 2017 and 2019, the number of audiology and CNS services both increased, while the number of ENT teleotology services fluctuated. Between 2019 and 2020, the number of services decreased across all 3 service types and then started to increase again in 2021. In 2023, the provisions of service were higher than the previous 6 years and all benchmarks were met within this reporting year (Figure 2.11).

Figure 2.11: Number of services provided, audiology, ENT and CNS, July 2012 – December 2023



Sources: Tables S2.1, S2.3 and S2.5.



3

Ear conditions and hearing health status

Ear conditions

Two main types of ear conditions are captured in the hearing health outreach services: otitis media, and Eustachian tube dysfunction (Box 3.1).

Box 3.1: Types of ear conditions

Otitis media: all forms of inflammation and infection of the middle ear. Active inflammation or infection is nearly always associated with a middle ear effusion (fluid in the middle ear space). Types of otitis media include:

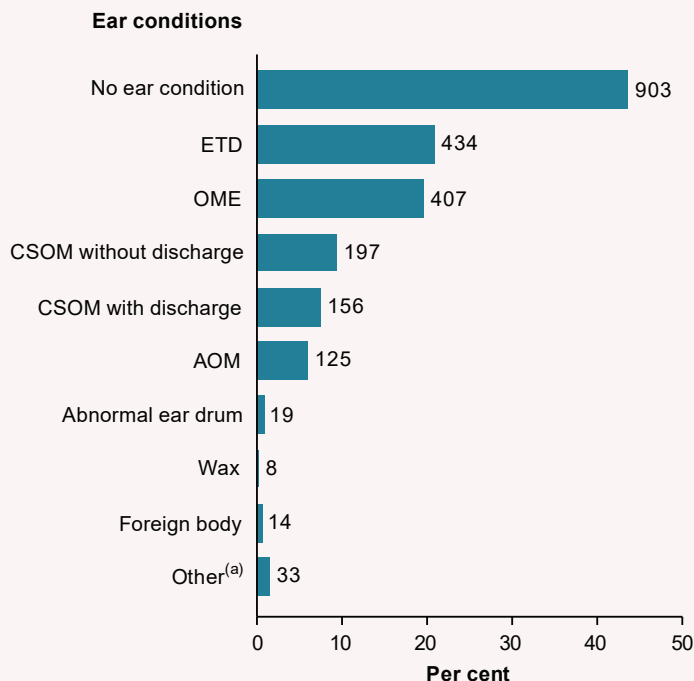
- **acute otitis media (AOM)** – the presence of fluid behind the eardrum plus at least 1 of the following: bulging eardrum, red eardrum, recent discharge of pus, fever, ear pain or irritability for less than 6 weeks
- **chronic suppurative otitis media (CSOM) with discharge** – a persistent suppurative discharge from the middle ear through a tympanic membrane perforation, for more than 6 weeks
- **chronic suppurative otitis media (CSOM) without discharge** – the presence of a perforation (hole) in the eardrum without evidence of discharge or fluid behind the eardrum (also known as inactive CSOM or dry perforation)
- **otitis media with effusion (OME)** – the presence of an intact eardrum and middle ear fluid without symptoms or signs of acute infection. OME may be episodic or persistent.

Eustachian tube dysfunction (ETD): negative middle ear pressure associated with compromised equalisation, impeding middle ear function and sometimes causing middle ear fluid accumulation.

In 2023, 2,067 First Nations children and young people received at least 1 audiology, CNS or ENT teleotology service. At their latest service, 1,108 children and young people were diagnosed with at least one type of ear condition. The proportion of children who were diagnosed with an ear condition declined from 66% in 2012 to 54% in 2023, although the proportions of specific ear conditions have had small fluctuations over the years.

In 2023, the most common type of ear condition, among the 1,108 children diagnosed with an ear condition was Eustachian tube dysfunction (ETD) (21%, or 434 cases), followed by otitis media with effusion (OME) (20%, or 407 cases); chronic suppurative otitis media (CSOM) without discharge (10%, or 197 cases); and chronic suppurative otitis media (CSOM) with discharge (8%, or 156 cases) (Figure 3.1).

Figure 3.1: Types of ear conditions among children and young people who received an audiology, CNS or ENT teleotology service in 2023



AOM – acute otitis media; CSOM – chronic suppurative otitis media; ETD – Eustachian tube dysfunction; OME – otitis media with effusion.

(a) ‘Other’ includes grommets, myringitis, otitis externa, tympanosclerosis, and other ear conditions.

Source: Table S3.1.



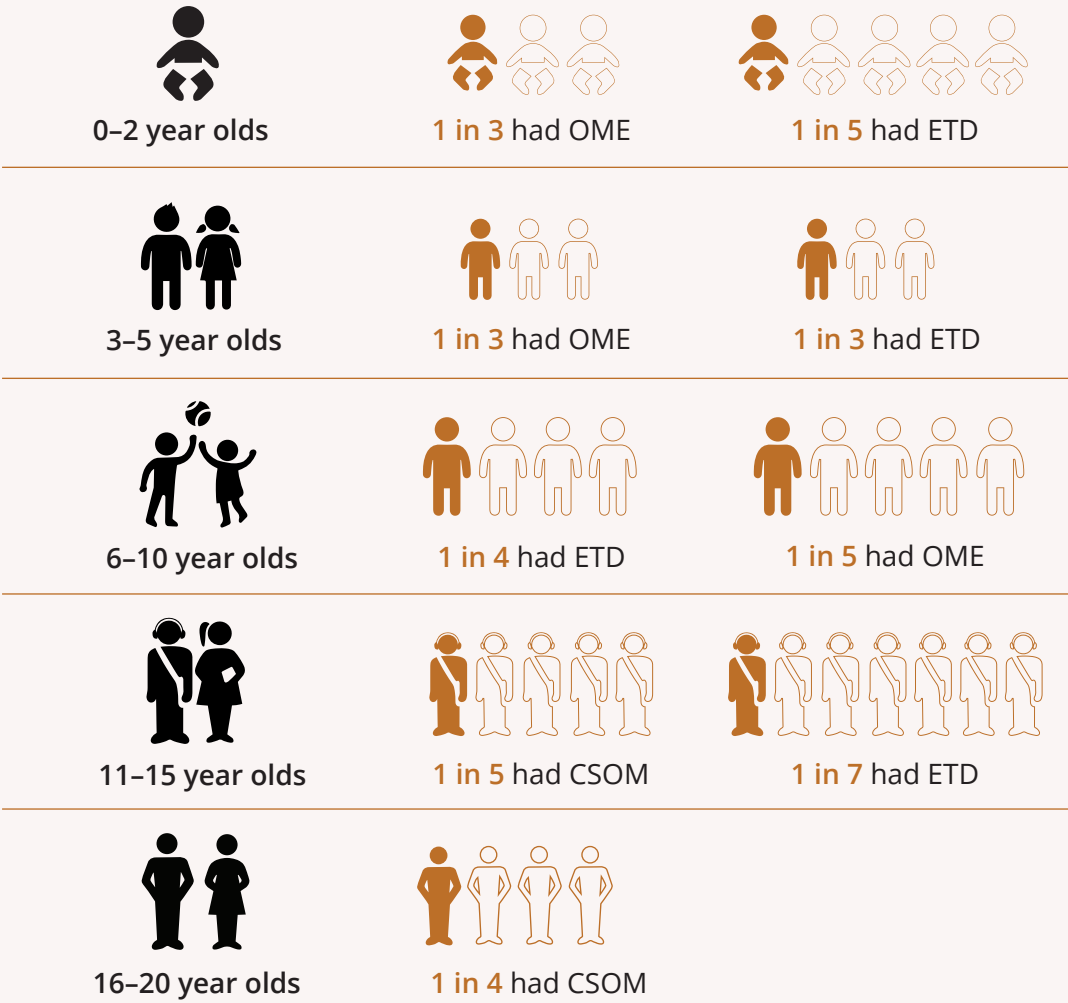
More than 1 in 2 children and young people (54%) were found to have ≥ 1 ear condition

Age and sex differences

The proportions of First Nations children with ear conditions varied by age group.

Younger children who received a service had the highest proportion of ear conditions. In 2023, 65% of children aged 0–2 and 42% of children aged 16–20 had at least one type of ear condition. This pattern reflects the natural profile of ear disease, where children typically grow out of ear conditions as they age (AIHW 2014c). The most common types of ear conditions differed among age groups in 2023, as shown in Figure 3.2. Similar patterns among age groups were seen in previous years.

Figure 3.2: Most common ear conditions in children and young people who received at least 1 audiology outreach, CNS or ENT teleotology service in 2023, by age group



Source: Table S3.2.

The following patterns were also observed:

- The proportion of otitis media with effusion and acute otitis media generally decreased with age.
- The proportion of Eustachian tube dysfunction generally fluctuated in early ages, but decreased for older children and young people.
- The proportion of chronic suppurative otitis media generally increased with age.
- The proportion of children and young people with no ear conditions generally increased with age.



Changes over time in ear health among children and young people

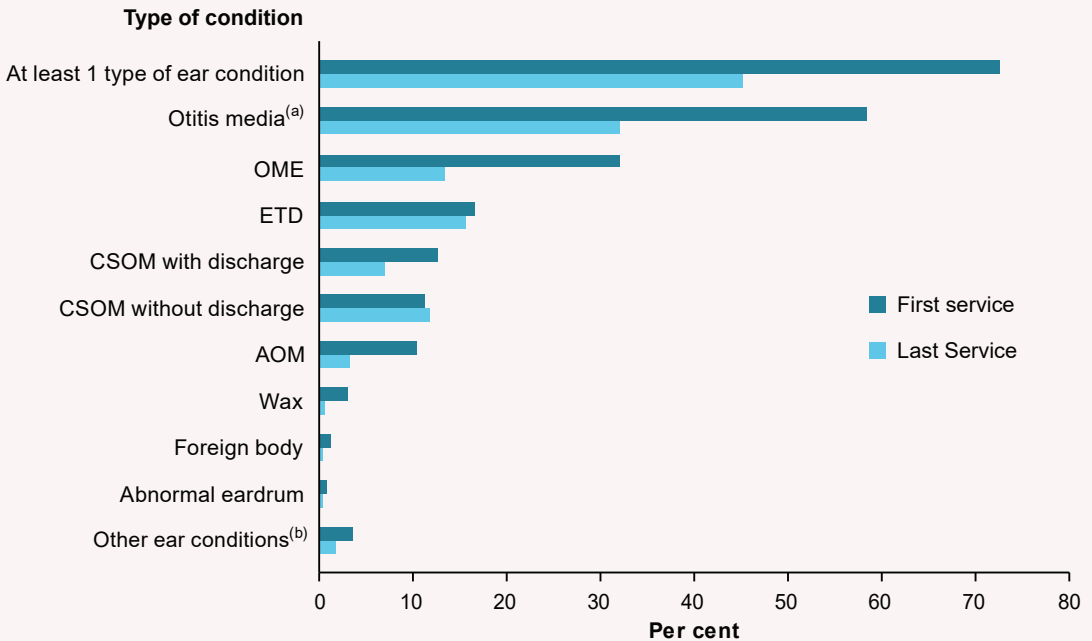
This section presents information about changes in ear conditions, hearing loss and hearing impairment in First Nations children and young people who received 2 or more audiology services during the hearing health outreach services treatment pathway. This is one way to understand the effectiveness of the hearing health outreach services in terms of improving outcomes. It is important to keep in mind that improvements may also be partially attributed to the natural progression of the disease as children and young people age.

This analysis includes only children and young people who received 2 or more services with a minimum interval of 3 months between their first and last service. A total of 5,844 (about 50%) First Nations children and young people met this criteria.

For almost all conditions between July 2012 and December 2023, there was an improvement over time. Figure 3.3 shows the change in proportion of ear conditions between first and last services:

- The number and proportion of First Nations children and young people with at least 1 type of ear condition decreased by 27 percentage points between the first and the last service, from 4,242 (73%) to 2,643 (45%).
- There was a decrease in the proportion of First Nations children with an ear condition between first and last services for the majority of middle ear conditions. However, for chronic suppurative otitis media without discharge, there was a slight increase in the number and proportion between first and last services, from 659 (11%) to 697 (12%).

Figure 3.3: Change in proportion of ear conditions between first and last hearing health service, among children who received at least 2 services, July 2012 to December 2023



AOM – acute otitis media; CSOM – chronic suppurative otitis media; ETD – Eustachian tube dysfunction; OME – otitis media with effusion.

- (a) Otitis media includes OME, CSOM with discharge, CSOM without discharge and AOM. The sum of these 4 conditions may exceed the total of otitis media as service recipients may have more than one ear condition.
- (b) Other ear conditions includes grommets, reduced ear drum movement or retracted ear drum, and other ear conditions.

Source: Table S3.3.

Ear conditions among CNS service recipients

First Nations children and young people who receive CNS services have a prioritised need for care. As such, it is important to examine these children and young people separately to track their hearing health as they move through the program.

In 2023, there were 1,060 First Nations children and young people who received a CNS service and consented to sharing information with the AIHW. Of those, 569 (54%) were diagnosed with at least one ear condition at their first CNS visit and 438 (41%) were found to have no ear condition; and a diagnosis could not be made for the remaining 53 (5%), including cases of indeterminate hearing loss and instances where the child could not be tested.



The most commonly diagnosed conditions were:

- Eustachian tube dysfunction (24%)
- otitis media with effusion (20%)
- acute otitis media (6.2%).

Among children who received a CNS service, the proportion diagnosed with otitis media with effusion was slightly lower in 2023 than in 2022 (20% compared with 23%). The proportion of CNS service recipients who had Eustachian tube dysfunction was also slightly lower in 2023 than 2022 (24% compared with 27%), however, the proportion with CSOM and AOM in 2023 was higher than in 2022.

This increase in the percentage of service recipients with more severe ear disease may reflect a targeted approach by the Northern Territory Hearing Service, focusing on children with more severe ear disease and hearing loss. This allows for better support for families through education, management, and access to medical and surgical pathways.

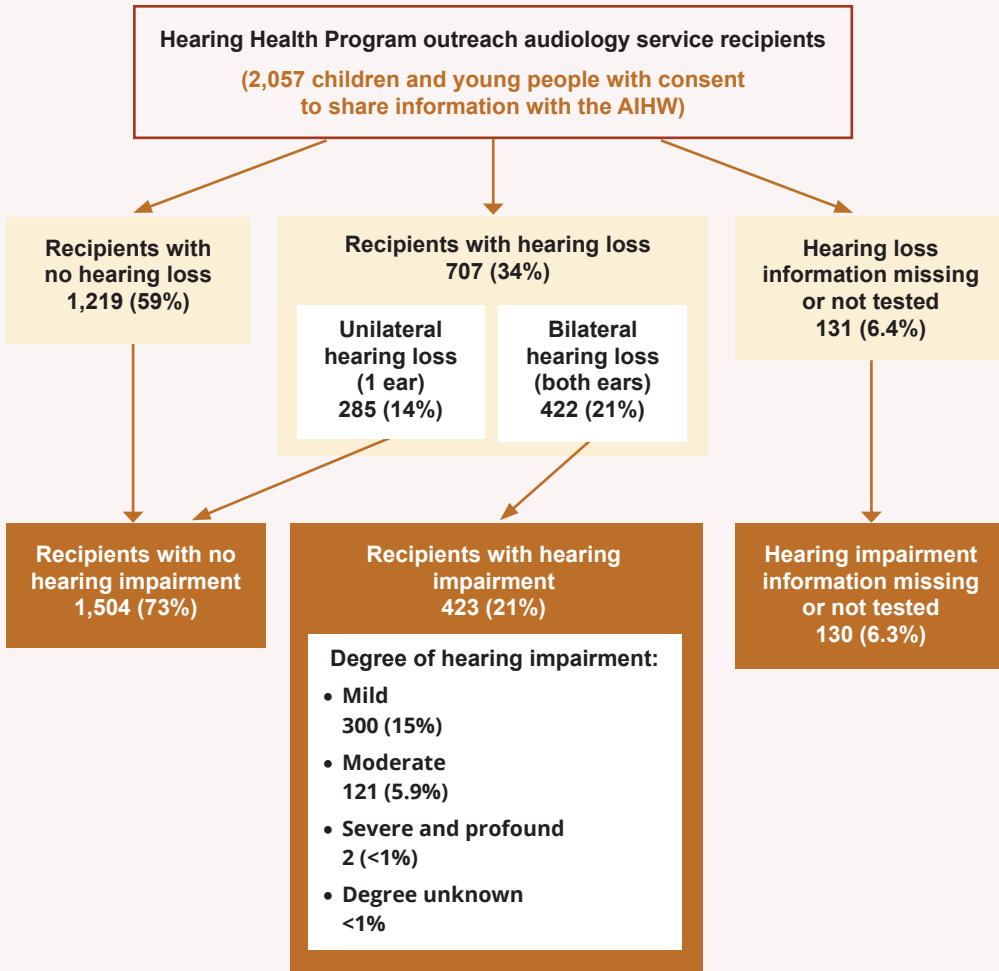
Find out more in Table S3.4.

Hearing status

Two measures of hearing status are used in this report: hearing loss and hearing impairment. 'Hearing loss' may affect one ear (unilateral) or both ears (bilateral). 'Hearing impairment' is based on the ear with the better hearing, meaning that children and young people with unilateral hearing loss are not defined as having a hearing impairment. Only those with bilateral hearing loss are classified according to the degree of hearing impairment.

Figure 3.4 shows the number and proportion of children and young people with hearing loss and hearing impairment among service recipients in 2023, and the relationship between each.

Figure 3.4: Hearing loss and impairment among First Nations children and young people who received audiology outreach services (including CNS service recipients), 2023



Note: Missing or not tested are cases where a diagnosis could not be made, including indeterminate hearing loss and instances where the child could not be tested.

Sources: Tables S2.1, S3.5 and S3.7.

Hearing loss

There are 3 types of hearing loss: conductive, sensorineural and mixed (Box 3.2). Among the 2,057 First Nations children and young people who received audiology outreach services in 2023, 707 (or 34%) had hearing loss:

- 431 (or 21%) had conductive hearing loss
- 15 (or 0.7%) had sensorineural hearing loss
- 17 (or 0.8%) had mixed hearing loss
- 244 (or 12%) had some form of hearing loss but type could not be determined.

Among the 2,057 First Nations children and young people who received audiology outreach 1,431 (or 70%) were visited by CNSs in 2023. Among these children, 543 (about 40%) had some form of hearing loss—23% bilateral and 15% unilateral.

The proportion of children with hearing loss who received both audiology and CNS services, decreased by 41 percentage points between July 2012 and December 2023 (from 79% to 38%).

Find out more in Table S3.6 and Table S3.8.

Variation by age and sex

Among First Nations children and young people who received an audiology service in 2023, the proportion with hearing loss varied by age group (Figure 3.5). Among children aged 3–5, 43% had hearing loss, the highest proportion of any age group.

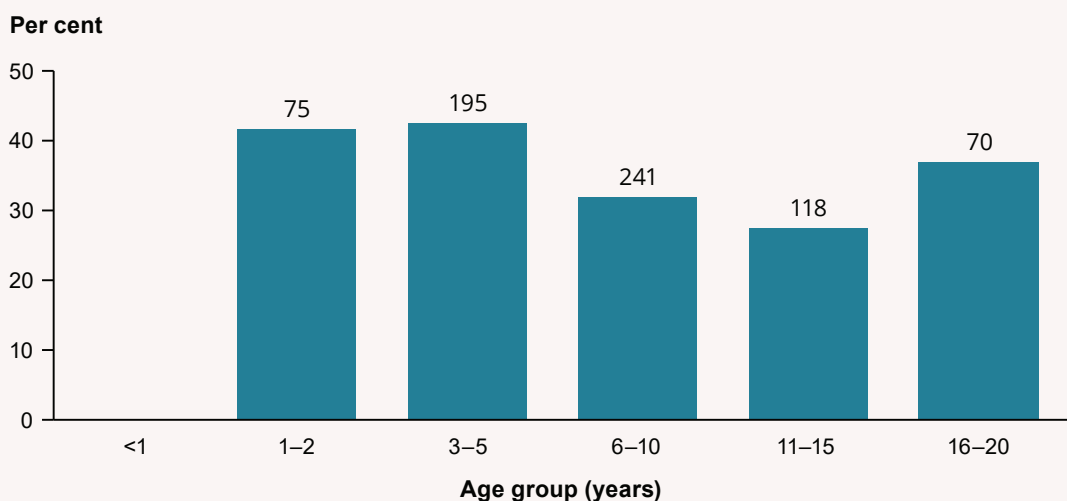
Box 3.2: Types of hearing loss

Conductive hearing loss: A deviation of hearing threshold from normal range associated with reduced conduction of sound through the outer ear, tympanic membrane (eardrum) or middle ear, including ossicles (middle ear bones).

Sensorineural hearing loss: A deviation of hearing threshold from the normal range, attributable to problems in the inner ear or vestibulocochlear nerve.

Mixed hearing loss: Hearing loss that has conductive and sensorineural components combined.

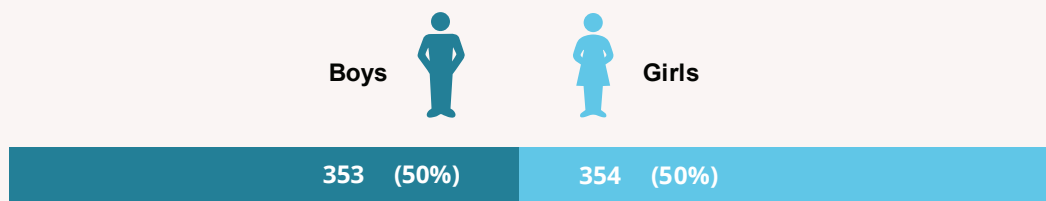
Figure 3.5: Proportion of children and young people with hearing loss who received audiology services in 2023, by age group



Source: Table S3.9.

Of the 707 children who received an audiology service in 2023 and had hearing loss, half of them were girls (Figure 3.6).

Figure 3.6: Hearing loss among children and young people in 2023, by sex

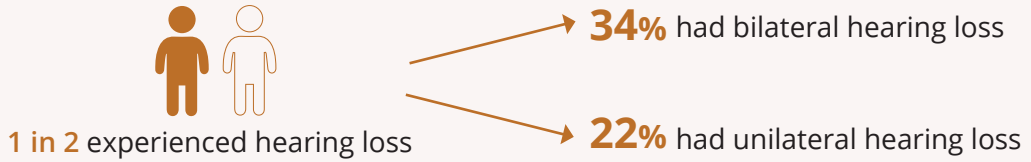


Hearing loss among children and young people with ear conditions

First Nations children and young people who had ear conditions were more likely to have hearing loss than those with no ear conditions (57% compared with 7.5% in 2023) (see Table S3.10). Among those with at least one ear condition, 34% had bilateral hearing loss and a further 22% had unilateral hearing loss (Figure 3.7).

Figure 3.7: Hearing loss among children and young people in 2023 with ear conditions

In **2023**, among children who were diagnosed with **at least 1** ear condition:



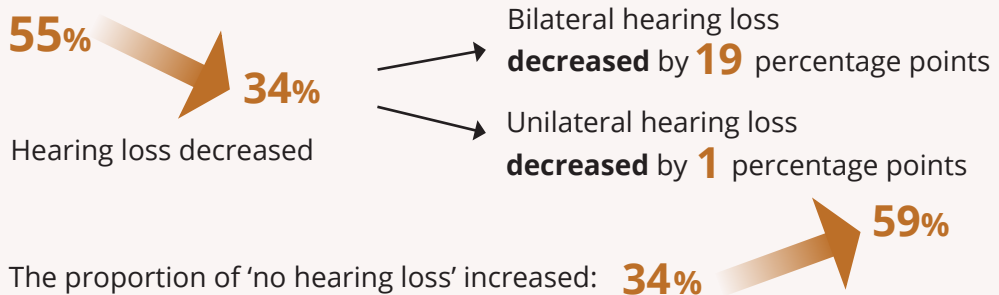
Source: Table S3.10.

Trends

Among First Nations children and young people who received an audiology service, the proportion with hearing loss decreased from 55% in July–December 2012 to 34% in 2023 (Figure 3.8).

Figure 3.8: Hearing loss among service recipients over time

When comparing service recipients from July–December 2012 and 2023:



Note: Information on hearing loss status was 'missing' for between 6.4% and 11.8% of service recipients in each year. These recipients were included in the denominator when calculating proportions with hearing loss.

Source: Table S3.5.

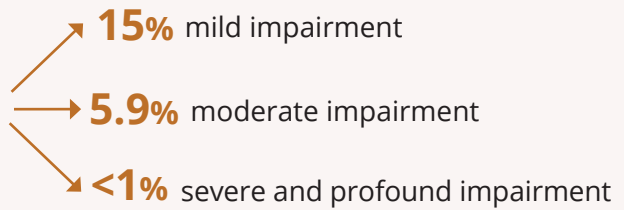
Hearing impairment

In this report, hearing impairment is defined as the degree of impairment associated with hearing loss in the 'better hearing ear', using a scale of mild, moderate, severe and profound (Australian Hearing, cited in Access Economics 2006). In 2023, 423 (21%) children and young people who received an audiology service had a hearing impairment (Figure 3.9).

Figure 3.9: Hearing impairment among service recipients in 2023

In 2023

423 service recipients
had a hearing impairment

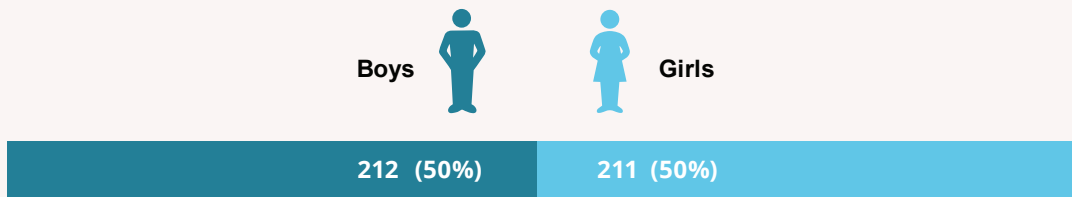


Source: Table S3.7.

Variation by age and sex

In 2023, of the 423 First Nations children and young people who received an audiology service and had a hearing impairment, half of them were girls (Figure 3.10).

Figure 3.10: Hearing impairment in 2023, by sex



In 2023, the proportion of First Nations children and young people with no hearing impairment generally increased with age, and hearing impairment tended to be more severe in younger than in older age groups (Figure 3.11).

Figure 3.11: Hearing impairment in 2023 for younger ages



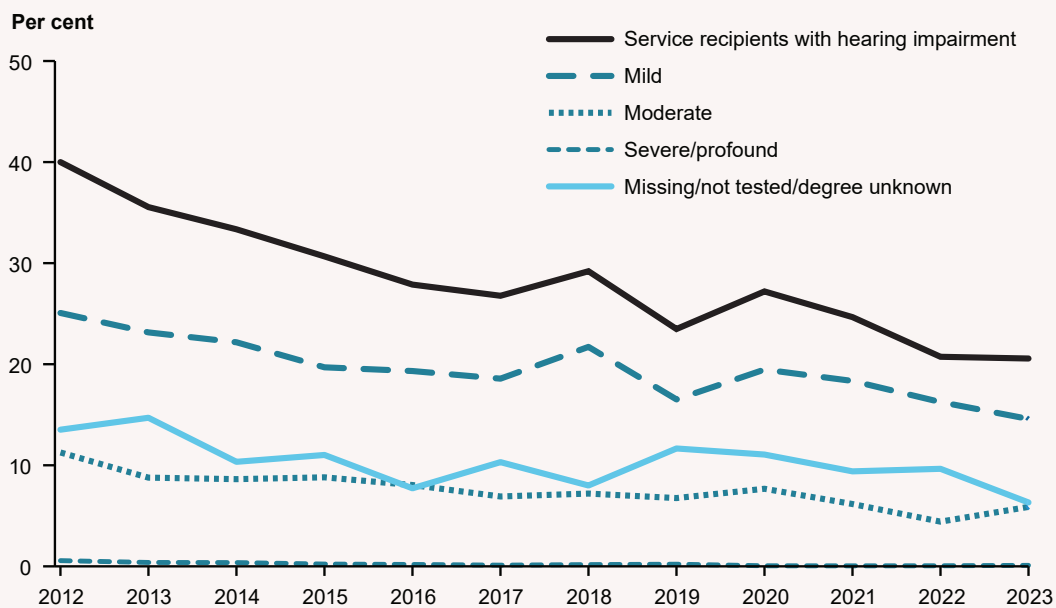
Source: Table S3.11.

The decrease in the severity of hearing impairment with age can be partly explained by the effects of both medical intervention and natural development (whereby children typically grow out of ear conditions and associated hearing loss). At older ages (3-5 onwards), it is likely that medical treatment and interventions for those with ear conditions help reduce the severity of hearing impairment and therefore reduce the proportion of children and young people with impairment.

Trends

Among First Nations children and young people who received outreach audiology services the proportion with a hearing impairment decreased, from 40% in 2012 to 21% in 2023 (Figure 3.12).

Figure 3.12: Degree of hearing impairment among children and young people, July 2012 to December 2023



Notes

1. Missing includes not stated, unsure and invalid responses.
2. Children and young people may not be tested if they find it difficult to co-operate with the procedure.

Source: Table S3.7.

Some of the hearing impairment decrease over time could be due to the natural progression of ear health, as previously discussed (see 'Variation by age and sex'). However, it may be more likely that the observed decrease is attributable to the increasing effectiveness of hearing health services, education and medical interventions. The Northern Territory Hearing Service particularly emphasises client and family education through both group health promotion and individualised consultations. Clients and carers receive consistent education on the importance of good ear health and the need for early intervention when issues arise.

It is hoped that the significant decrease in hearing impairment over time is, at least in part, a result of education and increased family engagement with primary health care for ear disease, as encouraged by the program. It is difficult to attribute such a large decrease in hearing impairment over a short period of time solely to the natural progression of the disease.

Overall, the effectiveness of these services can be measured only through an evaluation program, which is beyond the scope of this report.

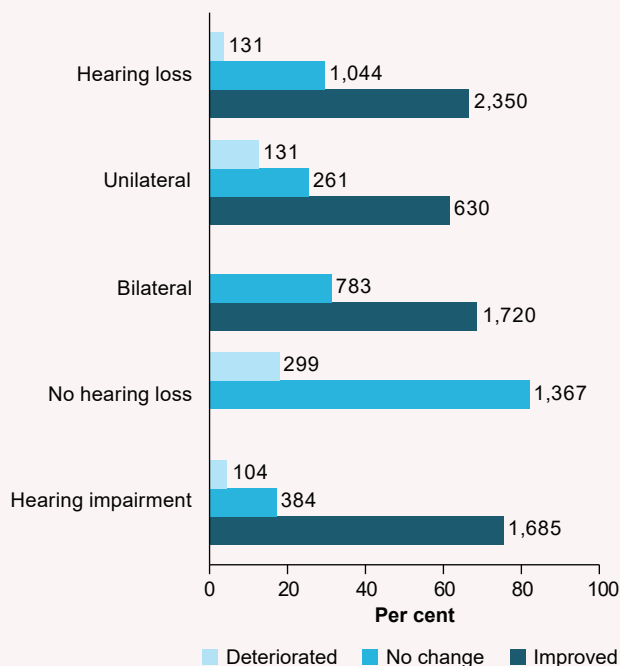
Changes among children who received 2 or more services between 2012 and 2023

One way to examine hearing health changes over time is by matching first and last visits among children and young people as they move through the health system. Individual children who received multiple audiology services were tracked to determine whether their hearing health changed (see Box 3.3).

Among the 5,191 First Nations children and young people who received 2 or more outreach audiology services between July 2012 and December 2023, hearing health generally improved over the period (Figure 3.13):

- Among 3,525 children with hearing loss, 2,350 children (67%) had an improved hearing loss status, 1,044 (30%) had no change in status, and 131 (3.7%) had deteriorated hearing loss status.
- Among the 1,666 children with no hearing loss, 1,367 (82%) had no change in status and 299 (18%) had deteriorated hearing status.
- Among the 2,233 children with hearing impairment, 1,685 (76%) had improved capability and for 104 (4.7%) capability had deteriorated.

Fig 3.13: Change in hearing loss and impairment among children who received at least 2 audiology services between July 2012 and December 2023



Source: Tables S3.12 and S3.13.

Box 3.3: Change in hearing capability across services

Hearing loss


Improved – a change in hearing loss status: (1) from bilateral hearing loss to unilateral hearing loss or no hearing loss or (2) from unilateral hearing loss to no hearing loss.

Deteriorated – a change in hearing loss status: (1) from no hearing loss to unilateral or bilateral hearing loss or (2) from unilateral hearing loss to bilateral hearing loss.

Hearing impairment

Improved – movement to a lower degree of hearing impairment (for example, from profound hearing impairment to severe, moderate or mild hearing impairment).

Deteriorated – movement to a higher degree of hearing impairment (for example, from mild hearing impairment to moderate, severe or profound).



Several factors might contribute to the observed improvements in hearing health. These include:

- the effectiveness of medical interventions, including surgical interventions
- the effect of health promotion activities in:
 - increasing awareness and knowledge of hearing health among families
 - improving the acceptance of and attendance at audiology services provided by outreach teams
- the natural improvement in the condition as children and youth get older
- the confounding factor of ‘missing’ and ‘not tested’ records, and missing information from children and youth for whom consent was not obtained.



4

Demand for ear and hearing health services and other follow-up services

The Australian Government-funded activities in the Northern Territory public hearing health system are valuable for children and young people. Since 2012, the number of children and young people accessing services has increased, along with consent rates for data sharing with the AIHW. Improvements in hearing health status across the years have also been consistently demonstrated. However, there is still a high demand for audiology and ENT services.

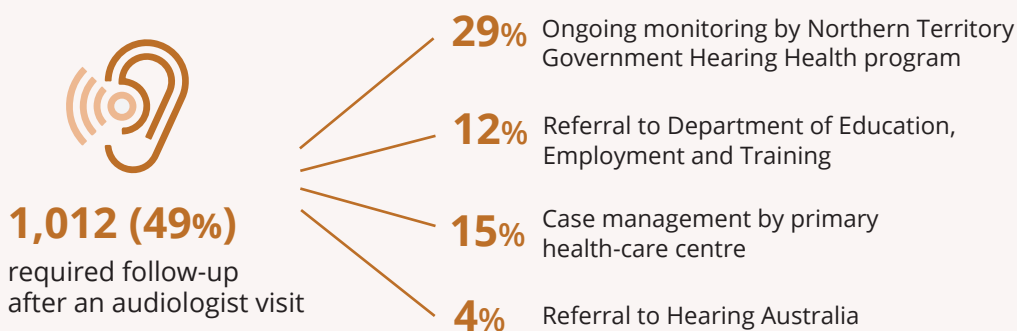
In addition to these hearing health services, children can be referred to other follow-up services. Follow-up can encompass a wide range of services, from having a hearing aid fitted by Hearing Australia, to medical treatment such as ear cleaning or the need for ENT surgery.

Follow-up services required after audiologist visits

In 2023, among 2,057 First Nations children and young people receiving an audiology service, 49% required at least 1 further action for follow-up. (Percentages in the infographic Figure 4.1 below sum to over 49% because some children required more than 1 referral).

Figure 4.1: Follow-up services required after audiologist visits

In 2023, 2,057 children and young people received an audiology service. Among these:



Source: Table S4.1.

Follow-up services required after ENT teleotology services

In 2023, among First Nations children and young people receiving an ENT teletology service 57% were given a recommendation for at least 1 further action for follow up.

Two types of action are recommended by ENT specialists:

- surgery – the most common types recommended were myringoplasty and myringotomy (see Glossary).
- further follow-up—this is the main ENT action recommended through the ENT teleotology service. This was primarily for an ENT review or an audiological assessment.

Waiting list for audiology and ENT teleotology services

Although many hearing health services have been provided, the demand for audiology services and ENT teleotology services remains high among First Nations children and young people in the Northern Territory. This may be due to the following factors:

- higher rates of ear disease among First Nations children in remote communities have been linked to social determinants of health, including overcrowded housing, low socioeconomic status, poverty, limited access to services, hygiene, and education levels in remote areas. While health promotion is a key focus of the Northern Territory Hearing Services, it alone cannot address the broader social determinants that contribute to poorer health outcomes for remote First Nations children.
- ear disease is a chronic condition that often requires multiple service events over a number of years
- regular training and education sessions on ear disease and hearing loss are being delivered in the community, which has resulted in increased knowledge and awareness of ear disease and the impacts of hearing loss
- more effective identification of ear disease in the community and through Hearing Services auditing processes results in an increase in referrals
- restricted capacity of Northern Territory Hearing Services to provide frequent service to some communities due to a lack of availability of ear and hearing health-care staff
- cultural events, inclement weather, and school and public holidays restrict the capacity of the teams to travel to remote communities all year round
- the geographical location and vast spread of First Nations communities can make access to services difficult
- the high rates of mobility between communities for families can hinder efforts to locate children in a timely manner and provide appropriate ear and hearing health.

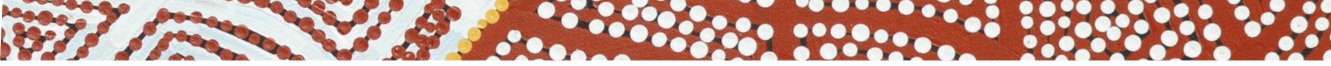
At the end of 2023, there were 5,246 First Nations children on the waiting list for Northern Territory Hearing Services, which is about 50% of total First Nations children and young people who were in the programs. Among them, 3,118 First Nations children and young people were on the audiology waiting list. Of these, 1,681 were new referrals for audiology services and 1,437 were recalls for further audiology follow-up.

In addition, 2,128 First Nations children and young people were waiting for ENT teleotology services in the Northern Territory. Of these, 797 were new referrals either from Primary Health Care physicians or identified through the audiology pathway and required ENT intervention. There were 1,331 children and young people who had been reviewed but required additional follow-up by ENT teleotology services.



5

Regional analysis



This report presents service delivery data for five regions: Top End, East Arnhem, Big Rivers, Barkly and Central Australia. This section presents data from annual snapshots of the hearing health status of the children and young people who received outreach audiology, CNS or ENT teleotology services in Top End, East Arnhem, Big Rivers and Central Australia regions from 2012 to 2023. For Barkly, data on hearing health outreach services were available from 2013.

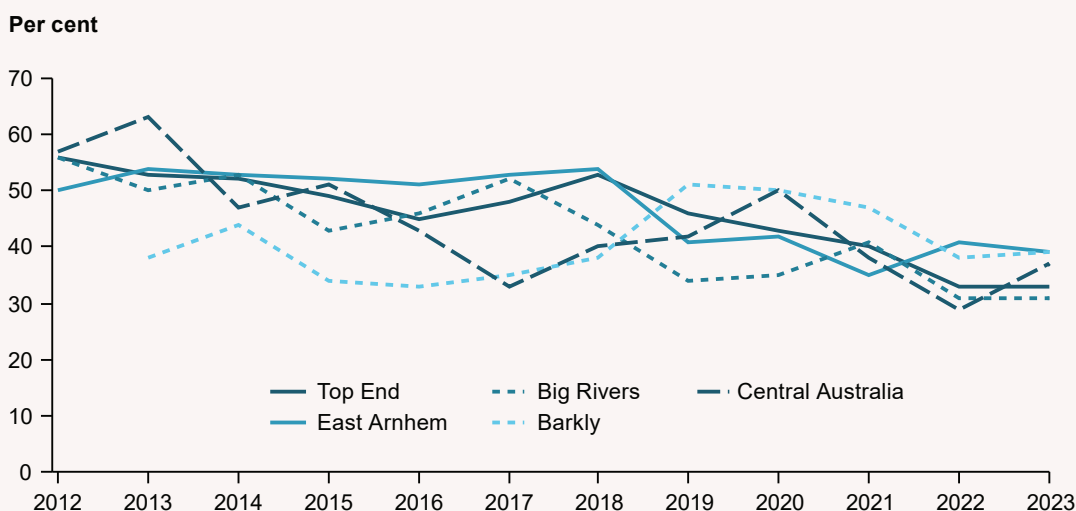
Hearing loss

Rates of hearing loss were generally similar for children in Top End, East Arnhem, Big Rivers and Central Australia between July 2012 and December 2016. However, in 2017 the difference in the proportion of children with hearing loss grew between the regions. Before 2019, rates of hearing loss were lower in Barkly than in other regions. In 2020, the gap between Top End, East Arnhem, Big Rivers, Barkly and Central Australia widened, before narrowing again in 2022 and 2023 (Figure 5.1).

From July 2012 to December 2023, the decreases of the proportion of First Nations children with hearing loss in Top End, East Arnhem, Big Rivers and Central Australia ranged from 11 to 25 percentage points. However, Barkly had higher proportion of First Nations children with hearing loss in 2023 than in 2013.

Oppositely, the increases of the proportion of First Nations children with no hearing impairment in Top End, East Arnhem, Big Rivers and Central Australia ranged from 8 to 25 percentage points during this period. However, trend should be interpreted with caution due to small number of observations.

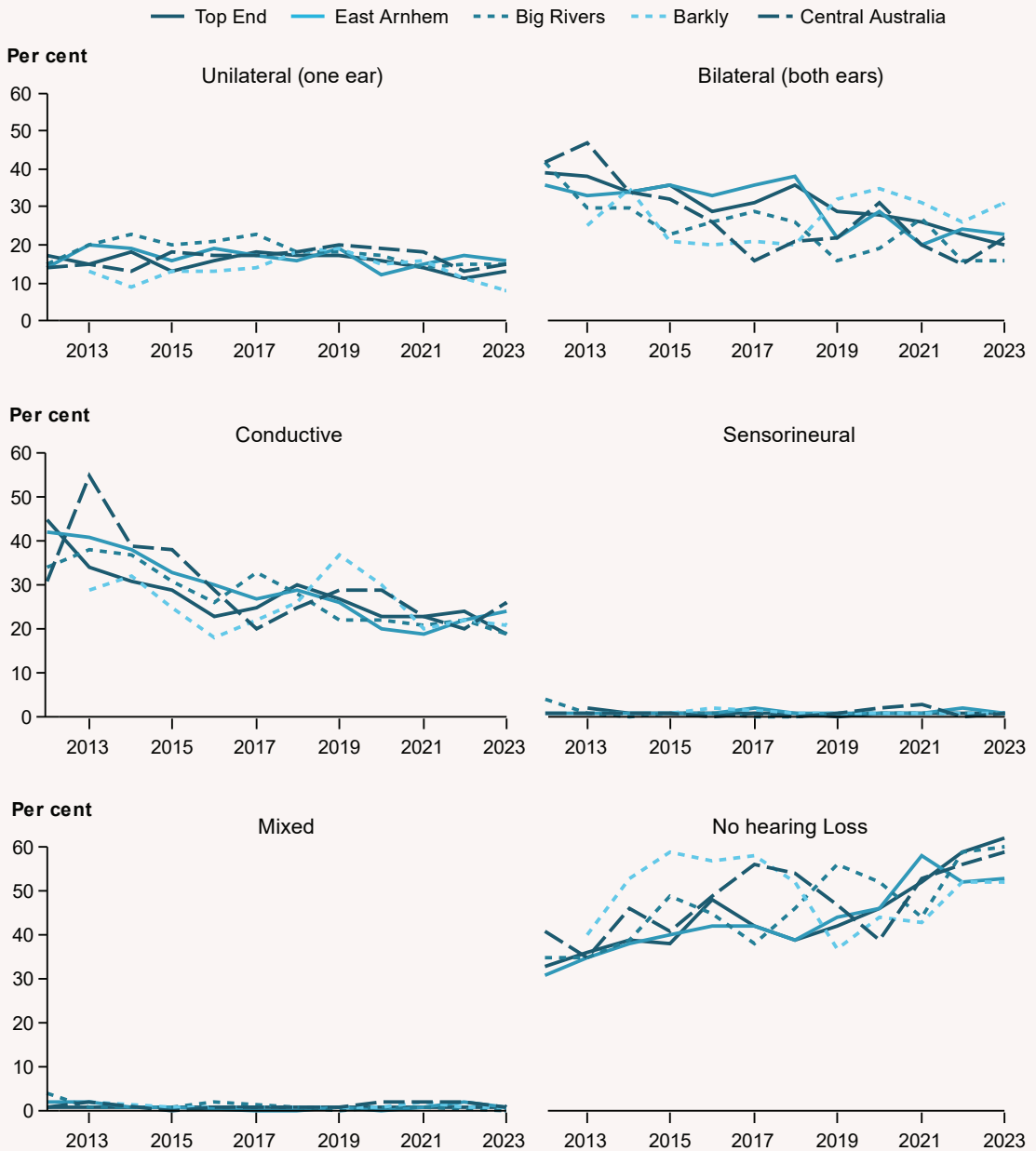
Figure 5.1: Hearing loss among children and young people who received outreach audiology services in Top End, East Arnhem, Big Rivers, Barkly and Central Australia



Source: Table S5.1.

looking at specific types of hearing loss (Figure 5.2), the proportions between children in the five regions show smaller differences for Unilateral hearing loss, Sensorineural hearing loss and mixed type of hearing loss. The differences are larger for Conductive hearing loss and no hearing loss type.

Figure 5.2: Types of hearing loss among children and young people who received outreach audiology services in Top End, East Arnhem, Big Rivers, Barkly and Central Australia



Source: Tables S5.1 and S5.2.

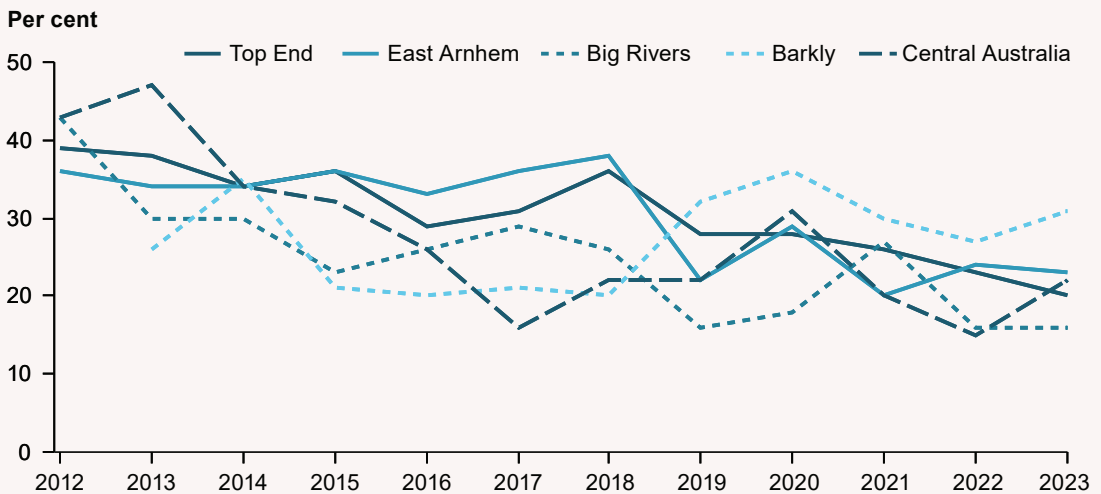
Hearing impairment

Overall, for Top End, East Arnhem, Big Rivers, Barkly and Central Australia, there were lower proportion of First Nations children with hearing impairment and higher proportion of First Nations children with no hearing impairment in 2023 compared to in July 2012 to December 2012. However, trend should be interpreted with caution due to small number of observations (Figure 5.3).

From July 2012 to December 2023, the decreases of the proportion of First Nations children with hearing impairment in Top End, East Arnhem, Big Rivers and Central Australia ranged from 13 to 26 percentage points. However, Barkly had higher proportion of First Nations children with hearing impairment in 2023 than in 2013.

Oppositely, the increases of the proportion of First Nations children with no hearing impairment in Top End, East Arnhem, Big Rivers, Barkly and Central Australia ranged from 8 to 25 percentage points during this period.

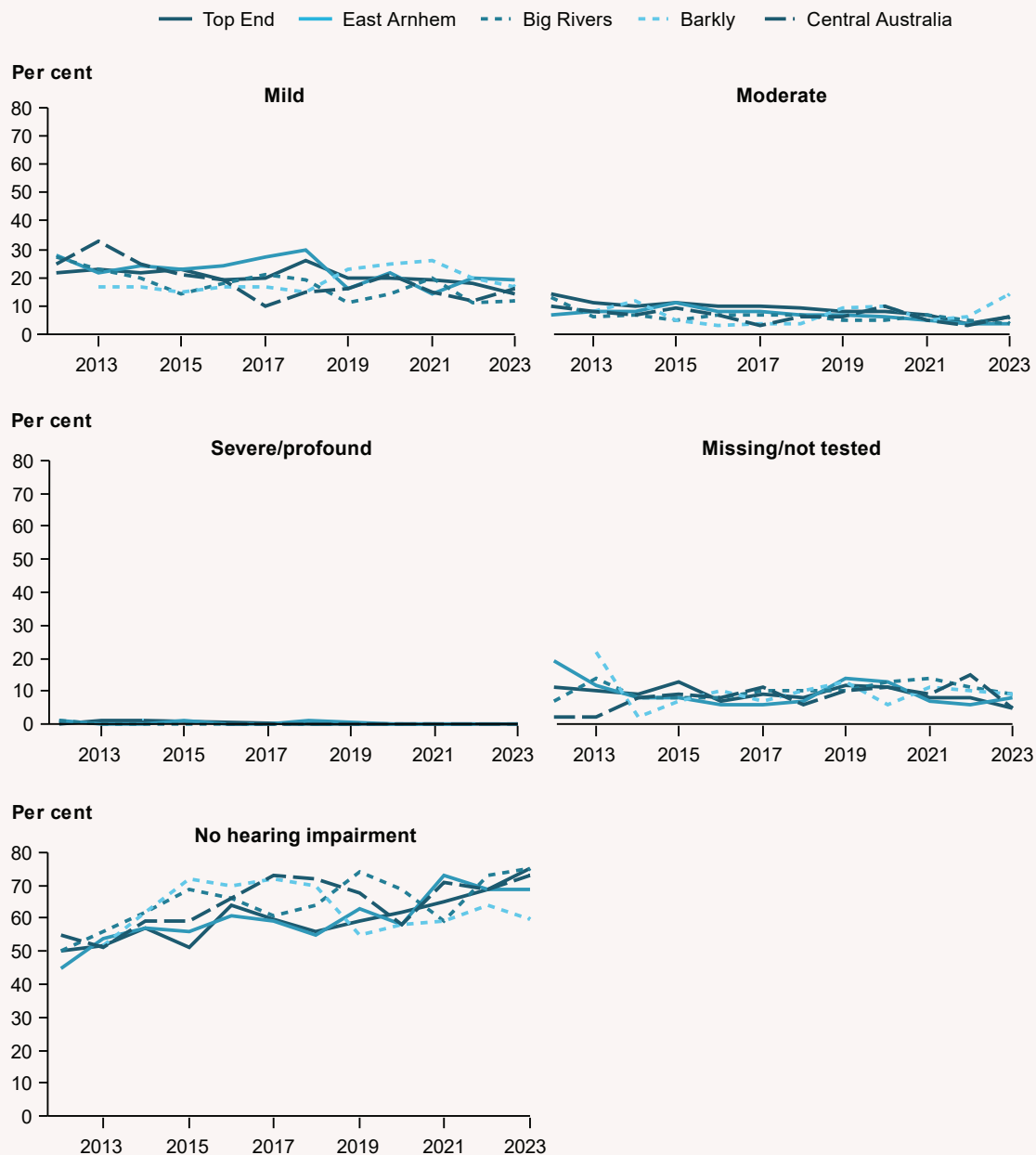
Figure 5.3: Hearing impairment among children and young people who received outreach audiology services in Top End, East Arnhem, Big Rivers, Barkly and Central Australia



Source: Table S5.3.

When looking at specific types of hearing impairment (Figure 5.4), the proportions between children in the five regions show smaller differences for Moderate and Severe/profound hearing impairment. The differences are larger for Mild hearing impairment and no hearing impairment type (Figure 5.4).

Figure 5.4: Types of hearing impairment among children and young people who received outreach audiology services in Top End, East Arnhem, Big Rivers, Barkly and Central Australia



Source: Table S5.3.

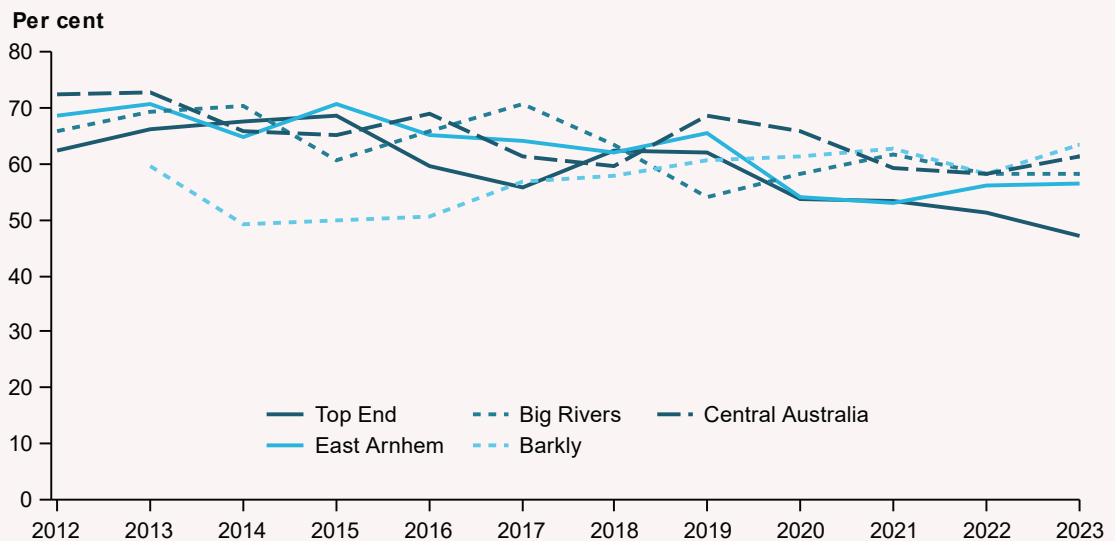
Ear conditions

Overall, for Top End, East Arnhem, Big Rivers, Barkly and Central Australia, there were lower proportion of First Nations children and young people who received an outreach audiology, CNS or ENT teleotology service and who had an ear condition in 2023 compared to in July 2012 to December 2012. However, trend should be interpreted with caution due to small number of observations (Figure 5.5).

From July 2012 to December 2023, the decreases of the proportion of First Nations children and young people who received an outreach audiology, CNS or ENT teleotology service and who had an ear condition in Top End, East Arnhem, Big Rivers and Central Australia ranged from 7 to 13 percentage points. However, Barkly had higher proportion of First Nations children and young people who had an ear condition in 2023 than in 2013.

Oppositely, the increases of the proportion of First Nations children and young people who received an outreach audiology, CNS or ENT teleotology service and who had no ear condition in Top End, East Arnhem, Big Rivers and Central Australia ranged from 10 to 19 percentage points during this period. However, Barkly lower proportion of First Nations children and young people who had no ear condition in 2023 than in 2013.

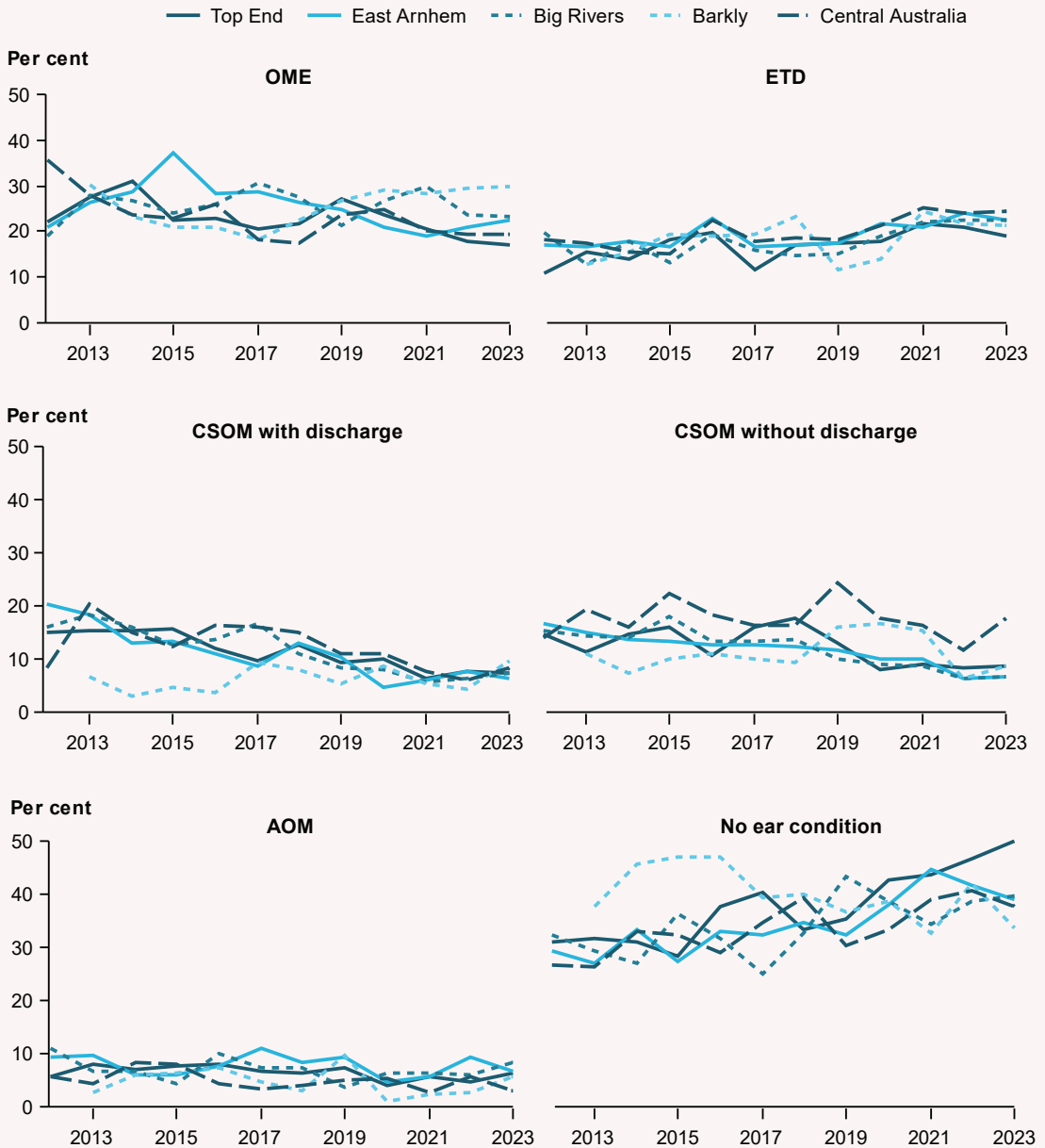
Figure 5.5: Presence of ear conditions among children and young people who received outreach audiology, CNS or ENT teleotology services in Top End, East Arnhem, Big Rivers, Barkly and Central Australia



Source: Table S5.4.

When looking at specific types of ear condition, the proportions between children in the five regions show smaller differences for ETD and AOM. The differences are larger for OME, CSOM and no ear condition type (Figure 5.6).

Figure 5.6: Distribution of specific ear conditions among children and young people who received a service in in Top End, East Arnhem, Big Rivers, Barkly and Central Australia



AOM – acute otitis media; CSOM – chronic suppurative otitis media; ETD – Eustachian tube dysfunction; OME – otitis media with effusion.

Source: Table S5.4.



6

Progress against benchmarks

The Hearing Health Program uses performance indicators and benchmarks to monitor outcomes. Targets are set jointly by the Australian and Northern Territory departments of health through the Northern Territory Health Implementation Plan (Council on Federal Financial Relations 2016) and Extension (Council on Federal Financial Relations 2022).

Service delivery

Service delivery benchmarks for hearing health service delivery are set for audiology, CNS and health promotion and training activities. These are measured by the number of services per year. In 2023, targets for all of these services were exceeded. Note that the Northern Territory Health Implementation Plan does not include targets for ENT services.

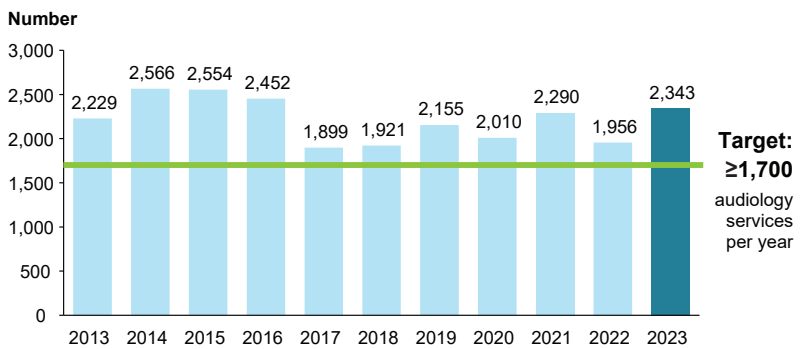
Audiology services

TARGET: ≥1,700 audiology services per year

Indicator:
Audiology services provided

The number of **audiology services** per year

Figure 6.1: Number of audiology services provided



Note: Data on audiology services provided to children and young people in some years between 2013 and 2019 may differ slightly from previous reports as a result of revisions and improvements to data quality.

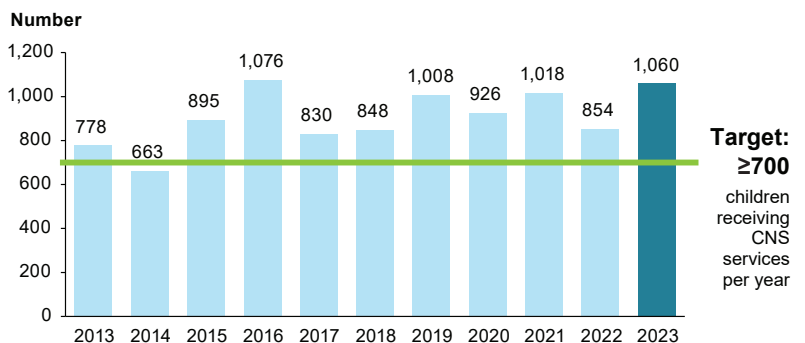
CNS services

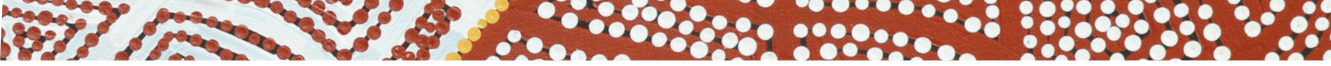
TARGET: ≥700 children receiving CNS services per year

Indicator:
CNS services provided

The number of children receiving complex case management services from **CNSs** working with primary health-care services

Figure 6.2: Number of First Nations children receiving CNS services



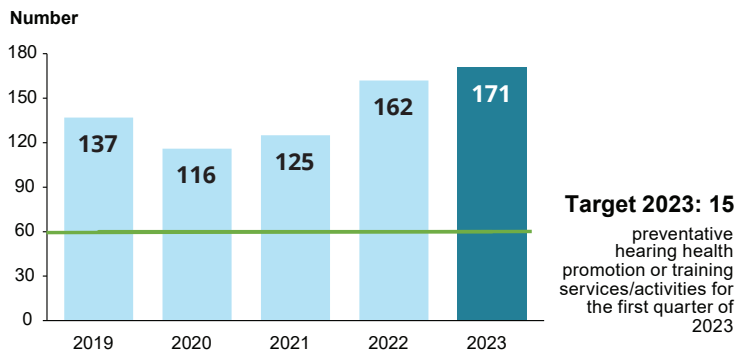


Health promotion services and activities

TARGET: 15 preventative hearing health promotion or training services/activities for the first quarter of 2023 representing 25% of annual service delivery

Indicator:
Health promotion
Delivery of hearing health promotion or training services and activities

Figure 6.3: Number of of services/activities provided January 2019 to December 2023



Appendix A: About the Hearing Health Program data collections

Data collection, management and reporting

The AIHW was commissioned by the Australian Government Department of Health and Aged Care to collect, manage and report on data from ear and hearing health outreach services in the Northern Territory.

These data are collected using paper data collection forms. Health professionals responsible for providing services complete a form with information about the child or young person's demographic characteristics; types of services provided; community where the service was provided; date of service; examination results; and medical interventions and recommendations.

How much data the AIHW receives on each child or young person depends on whether the child or young person's parent or guardian provides consent to share the information. There are 2 scenarios for the provision of data under the consent requirements:

- If consent is given, all de-identified data are sent to the AIHW.
- If consent is not given, a limited amount of aggregate information is provided to the AIHW. This includes the number of services provided and the number of children and young people receiving a service by 5-year age group, sex, and the community where the service was provided.

Throughout this report, the term 'services' refers to occasions of service. A child or young person may receive a number of services and have more than one record in each data collection. Each record in the collection corresponds to a single service, not to a single person.

Appendix B: Data quality statement

For all Northern Territory Remote Aboriginal Investment (NTRAI) Hearing Health Program data collections, the population included is not a random sample, nor is it representative of all First Nations children and young people in the Northern Territory. The outreach audiology and ear, nose and throat (ENT) teleotology services are available to all First Nations children and young people, but not all of them access these services. The Clinical Nurse Specialist (CNS) program is available only to First Nations children who have a referral from a health professional.

As well, some of these services are more commonly accessed by individuals in remote areas. Therefore, results of analyses cannot be generalised to all First Nations children and young people in the Northern Territory.

Outreach audiology data collection summary

- This data collection included about 11,000 children and young people, aged under 21, who received Northern Territory outreach audiology services between July 2012 and December 2023. This accounted for about 37% of the Northern Territory's First Nations population of this age group (but was not a random sample).
- Hearing loss status was missing for about 6% of service participants who completed audiology assessments in 2023, and this should be considered when using and interpreting hearing health data.
- The full data quality statement for the audiology data collection can be found online at: <https://meteor.aihw.gov.au/content/803638>

ENT teleotology data collection summary

- This data collection included about 4,600 children and young people who were aged under 21 and received ENT teleotology services between July 2012 and December 2023. This accounted for about 15% of the Northern Territory First Nations population of this age group (but was not a random sample).
- The methods of assessment used at ENT teleotology services differ from those for face-to-face consultations. Results of tests and subsequent diagnoses from teleotology services may be affected by the method of service delivery.
- The full data quality statement for ENT teleotology data collection can be found online at: <https://meteor.aihw.gov.au/content/803644>

CNS data collection summary

- The data collection includes over 6,600 children aged under 21 who received CNS services between July 2012 to December 2023. This accounted for about 22% of the Northern Territory's First Nations population of this age group (but was not a random sample).
- Prior to 2016, rates of non-consent were high for the CNS program (20% of services and 21% of children in 2015). However, there have been improvements in non-consent rates over time, and since 2018 there were no cases of non-consent. This should be considered when interpreting CNS program analyses.
- The full data quality statement for the CNS data collection can be found online at: <https://meteor.aihw.gov.au/content/803646>

Child Health Check Initiative (CHCI) data collections summary

- The data from August 2007 to July 2012 included in this report are from the CHCI data collections.
- Children who received child health checks or follow-up services were not a random sample of First Nations children in the Northern Territory. Health checks and services were available only to children in prescribed areas of the Northern Territory and were provided on a voluntary basis.
- The full data quality statement for the CHCI data collections can be found online at: <https://meteor.aihw.gov.au/content/index.phtml/itemId/480005>



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Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
AOM	acute otitis media
CAHS	Central Australia Health Service
CHCI	Child Health Check Initiative
CNS	Clinical Nurse Specialist
CSOM	chronic suppurative otitis media
CtG	Closing the Gap program
ENT	ear, nose and throat
ETD	Eustachian tube dysfunction
HP	Health priority
NT	Northern Territory
NTER	Northern Territory Emergency Response
NTRAI	Northern Territory Remote Aboriginal Investment
OME	otitis media with effusion
SFNT	National Partnership Agreement on Stronger Futures in the Northern Territory
TEHS	Top End Health Service
WHO	World Health Organization

Symbols

\geq	greater than or equal to
\leq	less than or equal to
$<$	less than
$>$	greater than

Glossary

acute otitis media (AOM): The general term for both acute otitis media without perforation and acute otitis media with perforation. It is the presence of fluid behind the eardrum plus at least 1 of the following: bulging eardrum, red eardrum, recent discharge of pus, fever, ear pain or irritability. A bulging eardrum, recent discharge of pus, and ear pain are the most reliable indicators of acute otitis media.

aural toilet: A procedure where a clinician clears wax, debris or foreign bodies from the ear canal. It is often used in treating patients with recurrent infections of the ear canal.

bilateral hearing loss: Hearing loss in both ears.

chronic suppurative otitis media (CSOM) with discharge: A persistent **suppurative** discharge from the middle ear through a tympanic membrane (ear drum) perforation for more than 6 weeks. Importantly, the diagnosis of CSOM with discharge is appropriate only if the tympanic membrane perforation is seen and if it is large enough to allow the discharge to flow out of the middle ear space.

chronic suppurative otitis media (CSOM) without discharge: The presence of a perforation (hole) in the eardrum without evidence of discharge or fluid behind the eardrum. It is also known as 'inactive chronic suppurative otitis media', and also as 'dry perforation'.

conductive hearing loss: A deviation of hearing threshold from the normal range associated with reduced conduction of sound through the outer ear, tympanic membrane (eardrum) or middle ear, including ossicles (middle ear bones).

Eustachian tube dysfunction (ETD): Negative middle ear pressure associated with compromised equalisation impeding middle ear function and sometimes causing middle ear fluid accumulation.

grommet: A small tube surgically placed across the eardrum to re-establish ventilation to the middle ear. It is also called a 'ventilation tube', 'pressure equalisation (PE) tube', or a 'tympanostomy tube'.

hearing: The sense for perceiving sounds; includes regions within the brain where the signals are received and interpreted.

hearing impairment: Describes the degree of impairment associated with hearing loss in the 'better hearing ear', using a scale of mild, moderate, severe and profound. It is based on degree of deviation from normal thresholds in the 'better ear', calculated as a 3-frequency average of the threshold of hearing (in dB HL)–500 Hz, 1000 Hz and 2000 Hz.

hearing loss: Any hearing threshold response (using audiometry) outside the normal range, at any sound stimuli, in either ear. Hearing loss in a population describes the number of people who have abnormal hearing. Hearing loss may affect 1 ear (unilateral) or both ears (bilateral).

mild hearing impairment: On average, the quietest sounds that people can hear with their 'better' ear are 16–30 dB HL in soundproof conditions and 26–35 dB HL in nonsoundproof conditions. These people are able to hear and repeat words spoken in a normal voice at 1 metre. Counselling and hearing aids may be needed.

mixed hearing loss: Hearing loss that has **conductive** and **sensorineural** components combined.

moderate hearing impairment: On average, the quietest sounds that people can hear with their 'better' ear are 31–60 dB HL in soundproof conditions and 36–60 dB HL in nonsoundproof conditions. These people are able to hear and repeat words spoken in raised voice at 1 metre and have difficulty keeping up with conversations without using a hearing aid.

myringoplasty: The repair of a perforation of the tympanic membrane (eardrum).

otitis media: All forms of inflammation and infection of the middle ear. Active inflammation or infection is nearly always associated with a middle ear effusion (fluid in the middle ear space).

myringotomy: Surgical incision into the eardrum, to relieve pressure or drain fluid.

otitis media with effusion (OME): The presence of an intact eardrum and middle ear fluid without symptoms or signs of acute infection. Other terms used to describe OME include 'glue ear', 'serous otitis media' and 'secretory otitis media'. OME may be episodic or persistent.

profound hearing impairment: On average, the quietest sounds that people can hear with their better ear are 91+ dB HL either in soundproof conditions or nonsoundproof conditions. These people are unable to hear and understand even a shouted voice. Hearing aids may help in understanding words. Additional rehabilitation is needed, and cochlear implants, lip-reading and sometimes signing are necessary.

sensorineural hearing loss: A deviation of hearing threshold from the normal range, attributable to problems in the inner ear or vestibulocochlear nerve.

severe hearing impairment: On average, the quietest sounds that people can hear with their better ear are 61–90 dB HL, either in soundproof conditions or non-soundproof conditions. These people are able to hear some words when shouted into the 'better' ear. Hearing aids are needed; if no hearing aids are available, lip-reading and signing may be necessary.

suppurative: Pus produced in response to inflammatory bacterial infections.

teleotology: Method of offsite service delivery whereby Nurse specialists and audiologists obtain full diagnostic hearing assessments, assess middle ear function, diagnose middle ear conditions and recommend further actions and treatment to an ear, nose and throat (ENT) specialist through a store and forward data collection service delivery model.

unilateral hearing loss: Hearing loss in one ear.

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Related publications

The following AIHW publications on the Child Health Check Initiative Closing the Gap; National Partnership on Stronger Futures in the Northern Territory; and Northern Territory Remote Aboriginal Investment hearing health programs may be of interest:

AIHW (Australian Institute of Health and Welfare) 2010. Health and wellbeing of young Australians: indicator framework and key national indicators. Bulletin no. 77. Cat. no. AUS 123. Canberra: AIHW.

AIHW 2011. Ear and hearing health of Aboriginal and Torres Strait Islander children in the Northern Territory. Cat. no. IHW 60. Canberra: AIHW.

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AIHW 2015. Hearing health outreach services to Aboriginal and Torres Strait Islander children and young people in the Northern Territory: 2012–13 to 2014–15. Cat. no. IHW 163. Canberra: AIHW.

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AIHW 2018. Northern Territory Outreach Hearing Health Program: July 2012 to December 2017. Cat. no. IHW 203. Canberra: AIHW.

AIHW 2019. Hearing health outreach services for Aboriginal and Torres Strait Islander children in the Northern Territory: July 2012 to December 2018. Cat. no. IHW 213. Canberra: AIHW.

AIHW 2020. Hearing health outreach services for Aboriginal and Torres Strait Islander children in the Northern Territory: July 2012 to December 2019. Cat. no. IHW 228. Canberra: AIHW.


AIHW 2021. Hearing health outreach services for Aboriginal and Torres Strait Islander children in the Northern Territory: July 2012 to December 2020. Cat. no. IHW 260. Canberra: AIHW.



AIHW 2022. Hearing health outreach services for Aboriginal and Torres Strait Islander children in the Northern Territory: July 2012 to December 2021. Cat. no. IHW 266. Canberra: AIHW.

AIHW 2023. Hearing health outreach services for Aboriginal and Torres Strait Islander children in the Northern Territory: July 2012 to December 2022. Cat. no. IHW 280. Canberra: AIHW.

These reports can be downloaded free from the AIHW website at <http://www.aihw.gov.au/publications>. The website also provides information on ordering printed copies.



This report is part of a series of annual reports that present information on hearing health outreach services provided to Aboriginal and Torres Strait Islander children and young people in the Northern Territory. In 2023, there were: 2,343 audiology services; 724 ear, nose and throat teleotology services; and 1,165 Clinical Nurse Specialist visits. Among children and young people who received at least 2 audiology services between 2012 and 2023, 67% had improved hearing loss and 76% had improved hearing impairment.

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