



Australian Government
**Australian Institute of
Health and Welfare**



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

July 2012 to
December 2022



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December 2022



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 for all Australians.

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Australian Institute of Health and Welfare

Board Chair

The Hon Nicola Roxon

Chief Executive Officer

Mr Rob Heferen

Any enquiries about or comments on this publication should be directed to:

Australian Institute of Health and Welfare

GPO Box 570

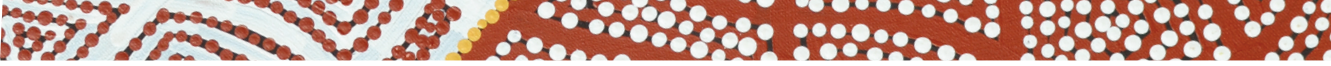
Canberra ACT 2601

Tel: (02) 6244 1000

Email: info@aihw.gov.au

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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. A number of 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 2022, 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 2022.

How many children received services?

- In 2022, 162 training sessions for hearing health education, promotion and prevention activities were provided to health-care staff.
- A total of 1,751 First Nations children and young people received at least 1 audiology, Clinical Nurse Specialist (CNS), or ear, nose and throat (ENT) teleotology service in 2022. From July 2012 to December 2022, a total of 41,259 CNS, audiology and teleotology services were provided to more than 11,000 children and young people.
- In 2022, 1,956 outreach audiology services were provided to 1,741 First Nations children and young people. From July 2012 to December 2022, a total of 22,796 audiology services were provided to about 10,100 children and young people.
- 575 ENT teleotology services were provided to 515 First Nations children and young people in 2022. From July 2012 to December 2022, a total of 8,814 teleotology services were provided to about 4,320 children and young people.
- In 2022, CNSs conducted 941 visits to 854 children. From July 2012 to December 2022, a total of 9,649 CNS services were provided to about 6,000 First Nations children.

Figure 1: Number of First Nations children and young people who received audiology, CNS or ENT teleotology service in 2022



1,741

children and young people received **audiology** services



854

children received **CNS** services



515

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 2022.

The percentage of First Nations children and young people with at least 1 ear condition decreased by 11 percentage points, from 66% (483 of 727 children and young people) to 55% (968 of 1,751 children and young people).

Among children and young people who received audiology services, the proportion with hearing loss decreased by 21 percentage points, from 55% (388 of 710 children and young people) to 34% (593 of 1,741 children and young people).

Figure 2: Ear and hearing health improvements between 2012 and 2022

66%



55%

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



55%

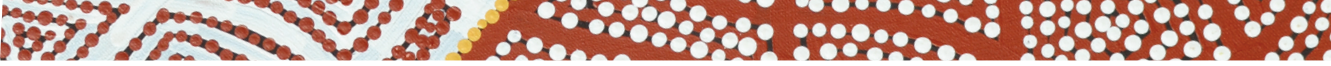


34%

Children and young people with **hearing loss**

Sources: Tables S3.1 and S3.6.

Among 4,738 First Nations children and young people who received at least 2 audiology services between 2012 and 2022, 3,291 had hearing loss at their first service, and of those, 2,108 (64%) had improved—this is a change from bilateral to unilateral hearing loss or from unilateral hearing loss to no hearing loss.



Between 2012 and 2022, among 2,092 First Nations children who received at least 2 audiology services and had hearing impairment at their first service, 1,535 (73%) 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 2022, there were 3,265 First Nations children and young people on the audiology waiting list. Among them, 1,903 were new referrals and 1,362 were recalled for further follow-up after receiving an initial audiology service. There were 2,284 children and young people on the waiting list for ENT teleotology services. Among them, 905 were new referrals and 1,379 were recalled for further follow-up after receiving initial ENT teleotology services.

Is the Hearing Health Program meeting its benchmarks?

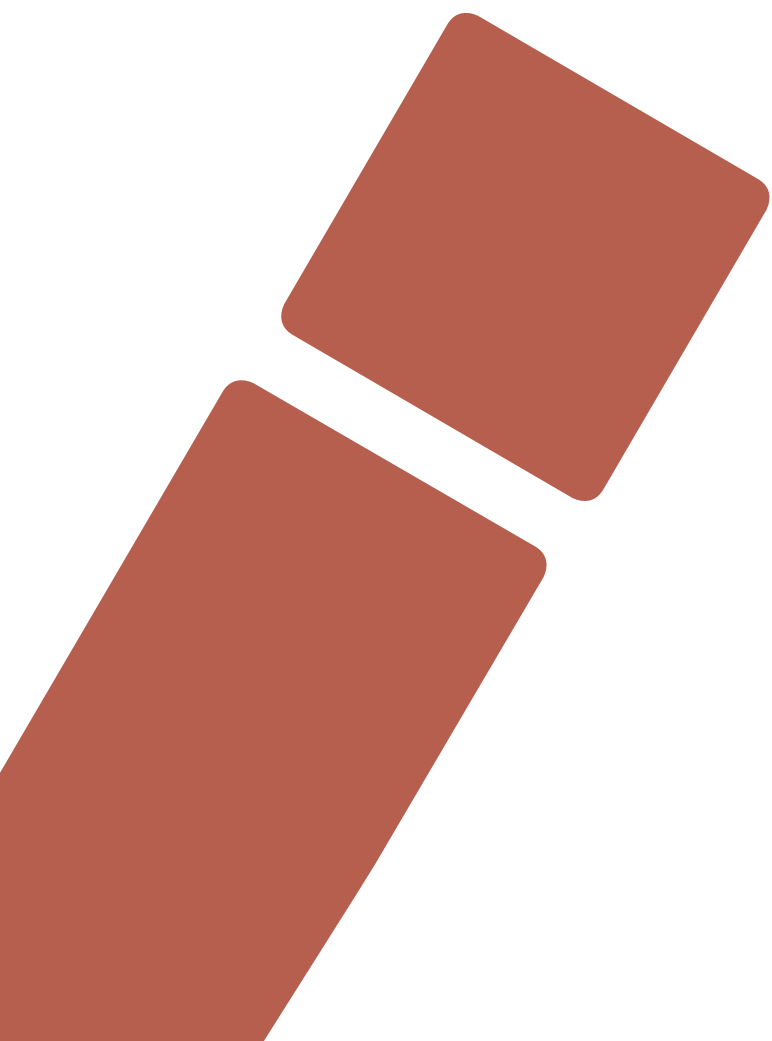
Service delivery benchmarks for hearing health are set in the Northern Territory Remote Aboriginal Investment (NTRAI) Health Implementation Plan for audiology, CNS and health promotion and training activities. These are measured by the number of services per year. In 2022, all 3 service delivery targets were exceeded.

Progress against benchmarks is presented in Table 1.

Table 1: Progress against benchmarks, 2022

Target	Outcome
Service delivery targets	
At least 1,700 audiology services per year	1,956 audiology services provided in 2022
At least 700 children receiving CNS services per year	854 children received CNS services in 2022
At least 15 hearing health promotion or training services/activities per quarter (60 per year)	162 hearing health promotion or training services and activities provided in 2022

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.

There are 4 services in the NTRAI Hearing Health Program (detailed information on these services can be found in Chapter 2):

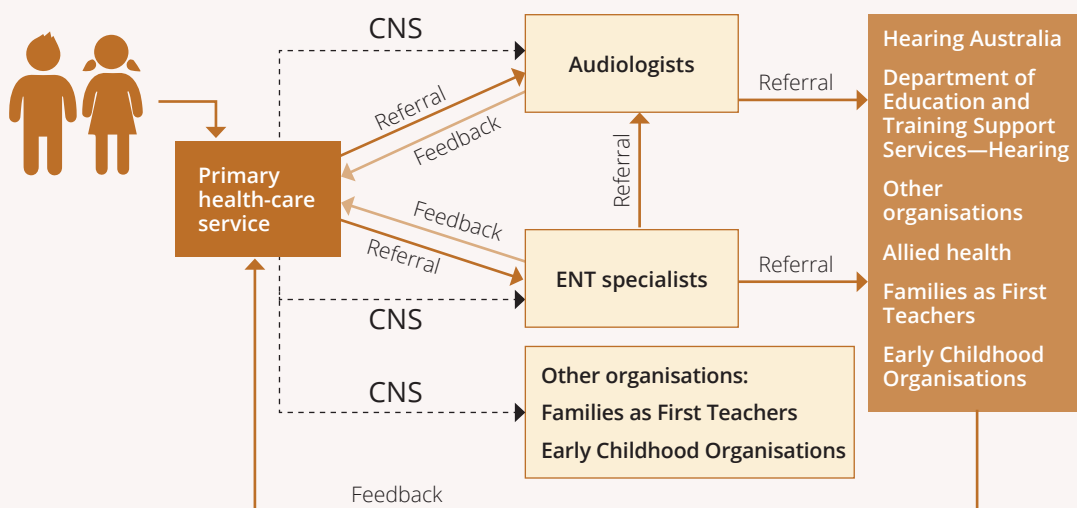
1. Health education, promotion and prevention
2. Outreach audiology
3. ENT teleotology
4. Clinical Nurse Specialists (CNS)–Case Management and Health Promotion.

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 2022, there were an estimated 29,558 First Nations people aged under 21 in the Northern Territory (ABS 2019).

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. 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 2022 on hearing health outreach services provided to the First Nations children and young people aged under 21 in the Northern Territory. 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 2021*, 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-outreach-services-for-aboriginal-an/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 2022. 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 0–20, 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

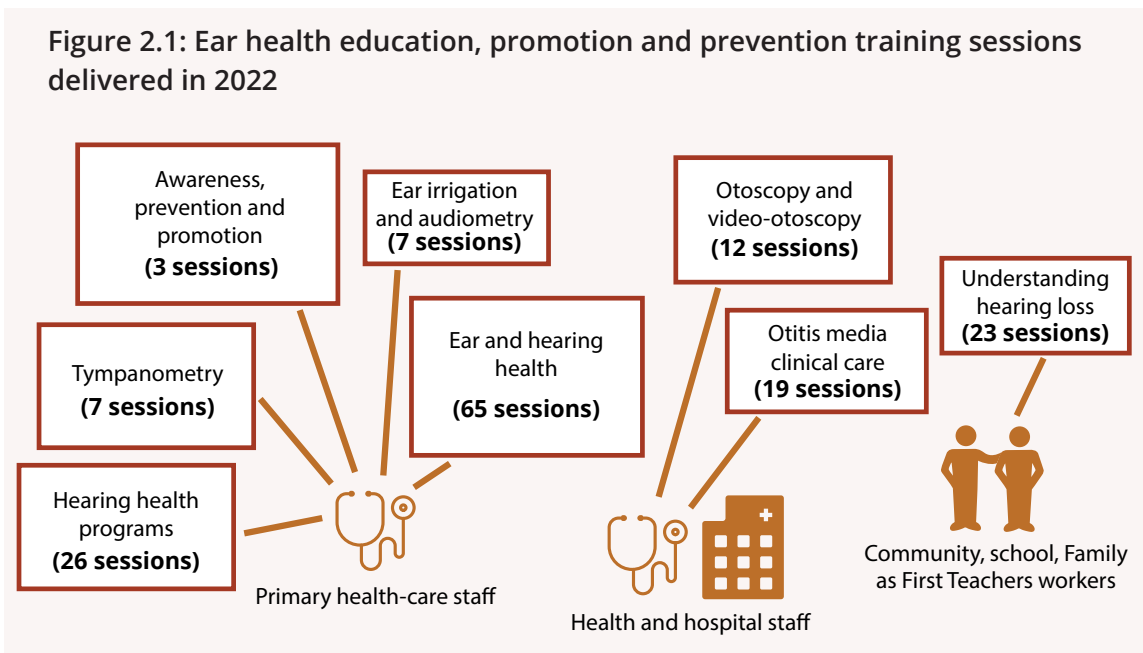
Service delivery

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
- a health promotion hip-hop music video addressing ear health
- 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 2022, 162 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.



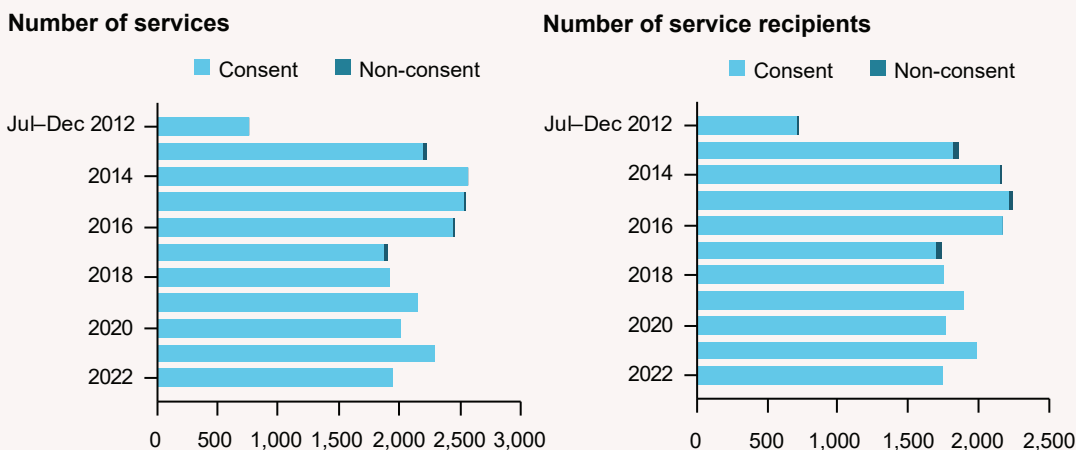
Outreach audiology

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 2022, 1,956 audiology services were provided to 1,741 service recipients (Figure 2.2).
- From July 2012 to December 2022, a total of 22,796 services were provided to about 10,100 service recipients.
- In 2022, the numbers of audiology services and service recipients decreased from 2021 but were comparable to 2020.

Figure 2.2: Number of outreach audiology services and service recipients, July 2012 to December 2022



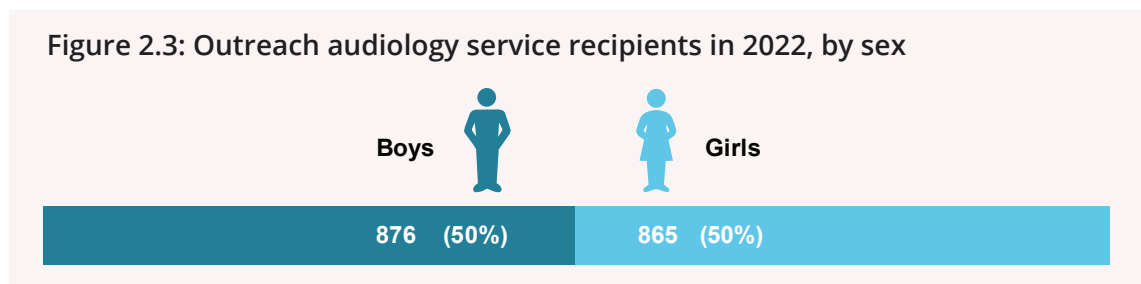
Notes

1. The total number of service recipients in July 2012 to December 2022 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.

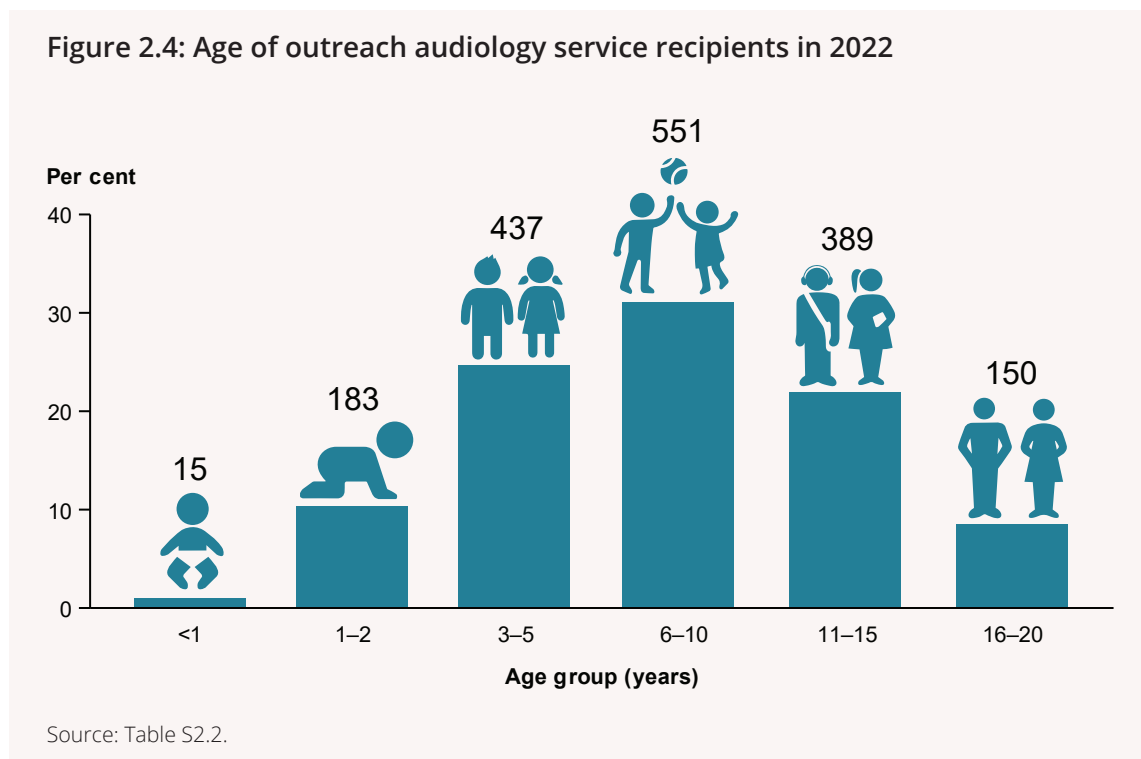
Source: Table S2.1.

Generally, rates of non-consent to share information for audiology services are low, and from 2018 to 2022 there were no cases of non-consent for audiology service recipients.

In 2022, a similar number of boys and girls received audiology services (876 and 865, respectively) (Figure 2.3).



In 2022, about 1 in 3 (32%) service recipients were aged 6–10 (Figure 2.4).



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

ENT teleotology services

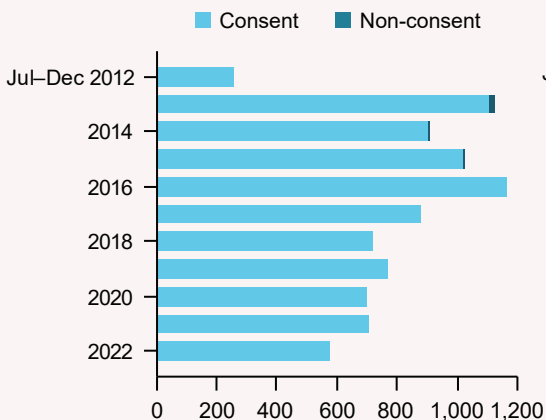
The ENT teleotology service model was developed to meet the demand for ENT services in remote Northern Territory communities. An outreach visit from an audiologist and ENT nurse provides both hearing and full clinical assessments. Video-otoscopy is performed and video sequences, clinical history and 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.

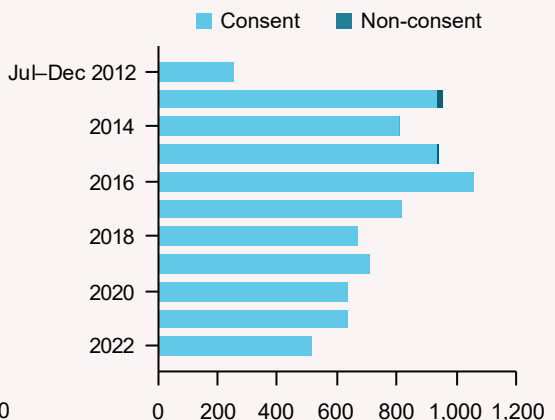
- In 2022, 575 ENT teleotology services were provided to 515 service recipients (Figure 2.5).
- From July 2012 to December 2022, a total of 8,814 services were provided to about 4,320 service recipients.
- The numbers of ENT services and service recipients have decreased slightly since 2019. In 2020 and 2021, COVID restrictions impacted on service delivery.

Figure 2.5: Number of ENT teleotology services and service recipients, July 2012 to December 2022

Number of services



Number of service recipients



Note: The total number of service recipients in July 2012 to December 2022 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 between 2016 and 2022 there were no instances of non-consent.

In 2022, the number of service recipients who were girls was slightly higher than the proportion who were boys (270 compared with 245) (Figure 2.6).

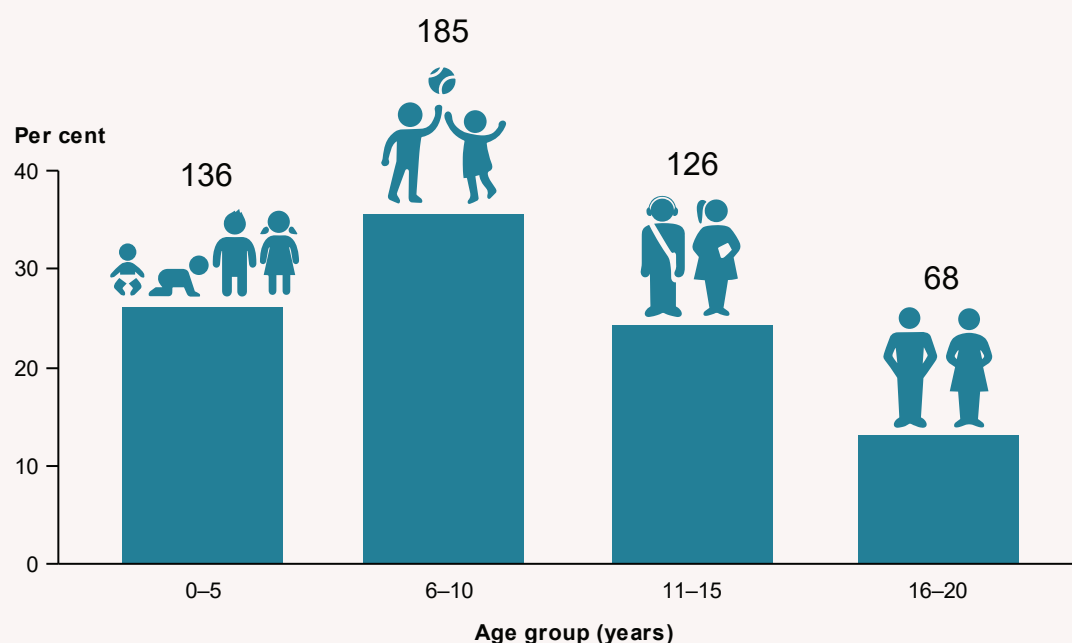
Figure 2.6: ENT teleotology service recipients in 2022, by sex



Source: Table S2.4.

Among service recipients in 2022, the highest proportion (36%) were aged 6–10 (Figure 2.7).

Figure 2.7: ENT teleotology service recipients in 2022, by age group



Source: Table S2.4.

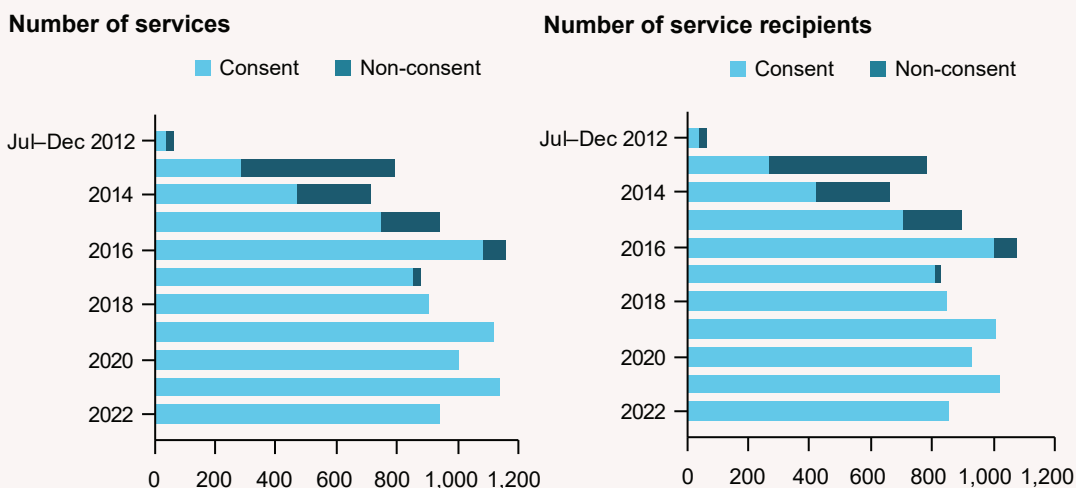
More information on ENT services, such as services recommended by ENT specialists, can be found in the supplementary tables online.

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 2022, 941 CNS services were provided to 854 service recipients (Figure 2.8).
- From July 2012 to December 2022, a total of 9,649 services have been provided to about 6,000 service recipients.
- The numbers of CNS services and service recipients decreased in 2022.

Figure 2.8: Number of CNS services and service recipients, July 2012 to December 2022



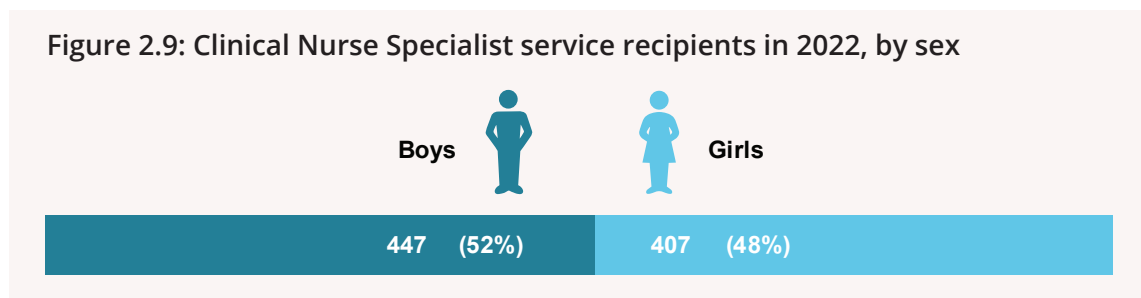
Notes

1. The total number of service recipients in July 2012 to December 2022 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.

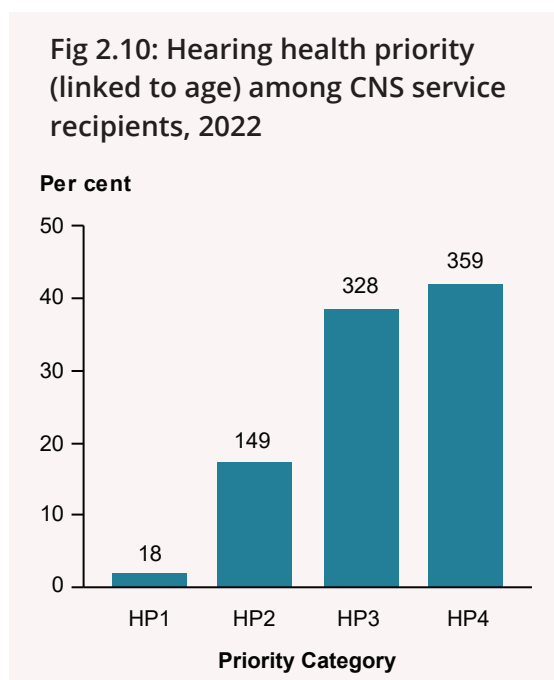
Source: Table S2.5.

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.

Slightly more boys than girls received CNS services in 2022 (447 compared with 407) (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 2022: 4 in 5 children (80%) 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.

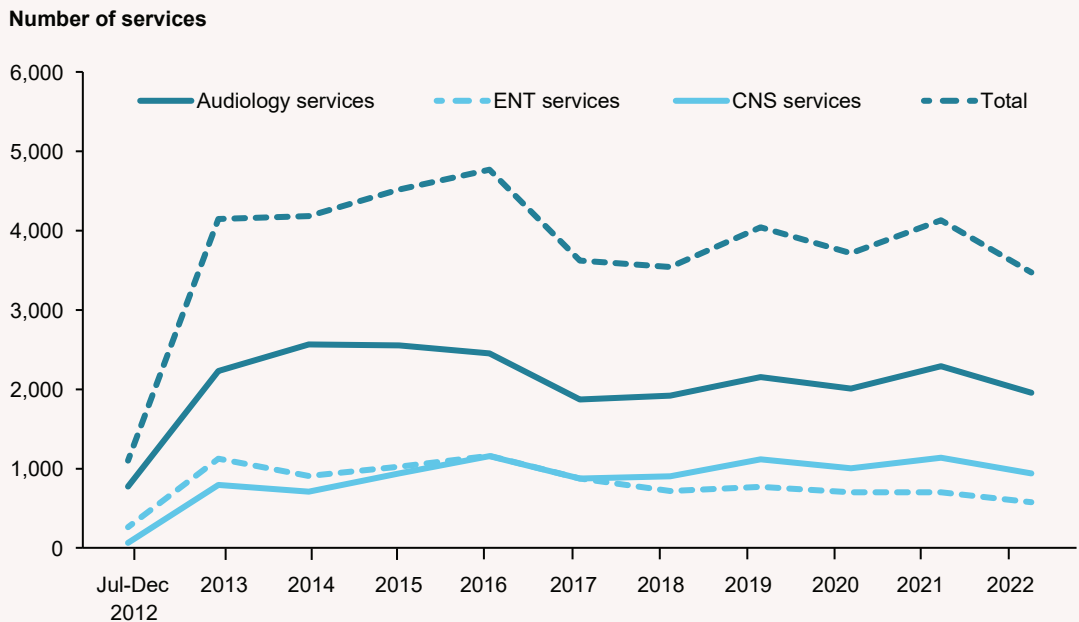
More information on CNS services can be found in the supplementary tables (S2.5 and S2.6).

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 2022, the provisions of service were lower than the previous 3 years and were similar to that seen in 2018, however all benchmarks were still met within this reporting year (Figure 2.11).

Figure 2.11: Number of services provided, audiology, ENT and CNS, July 2012 – December 2022



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:

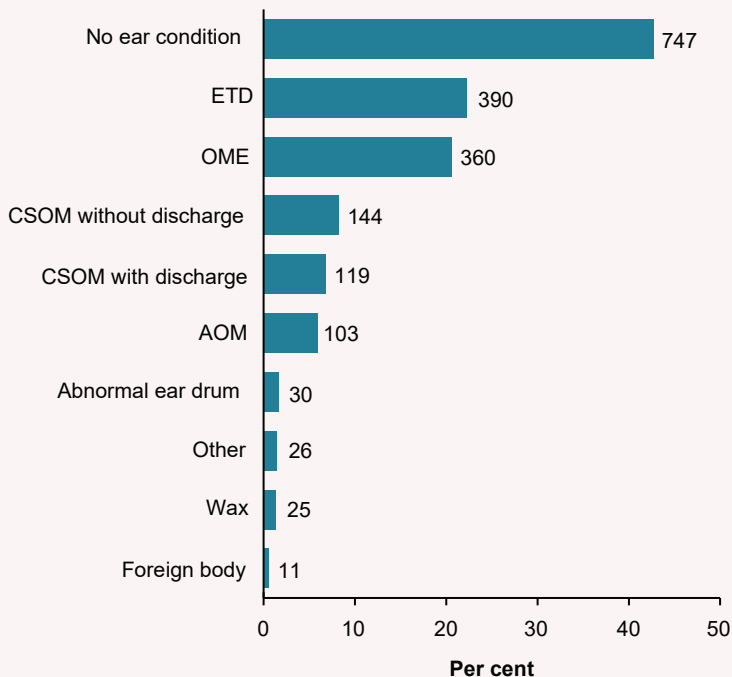
- **acute otitis media (AOM)**—the presence of fluid behind the eardrum plus at least 1 of the following: bulging eardrum, red eardrum, recent discharge of pus, fever, ear pain or irritability for less than 6 weeks
- **chronic suppurative otitis media (CSOM) with discharge**—a persistent suppurative 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 2022, 1,751 First Nations children and young people received at least 1 audiology, CNS or ENT teleotology service. At their latest service, 968 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 55% in 2022, although the proportions of specific ear conditions have had small fluctuations over the years.

In 2022, the most common type of ear condition, among the 968 children diagnosed with an ear condition was Eustachian tube dysfunction (ETD) (22%, or 390 cases), followed by otitis media with effusion (OME) (21%, or 360 cases); chronic suppurative otitis media (CSOM) without discharge (8%, or 144 cases); and chronic suppurative otitis media (CSOM) with discharge (7%, or 119 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 2022



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

Notes:

1. 'Other' includes grommets, myringitis, otitis externa, tympanosclerosis, and other ear conditions.
2. 'No ear condition' includes children with normal ears post surgical intervention (myringoplasty)

Source: Table S3.1.

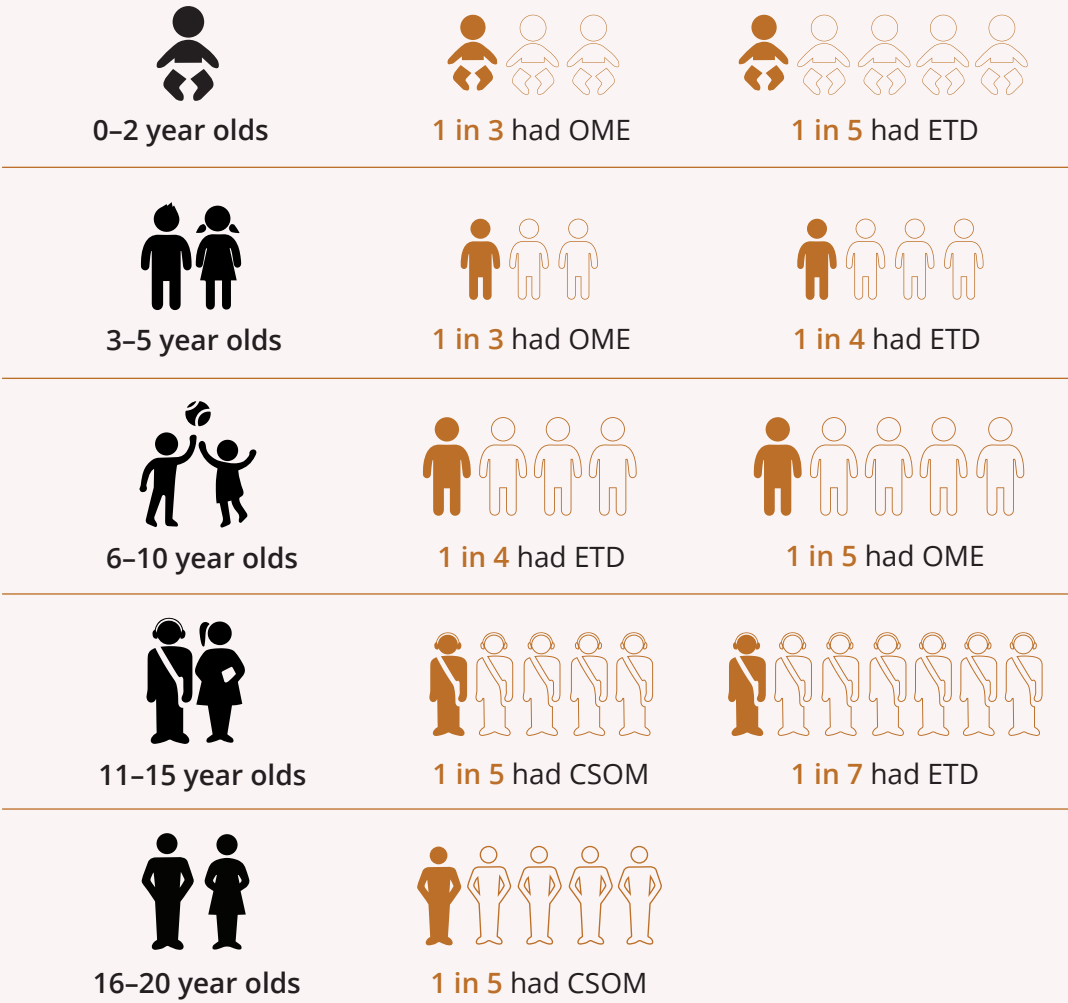
Around 3 in 5 children and young people (55%) were found to have ≥ 1 ear condition

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 2022, 68% of children aged 0–2 and 40% 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 2022, 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 2022, 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

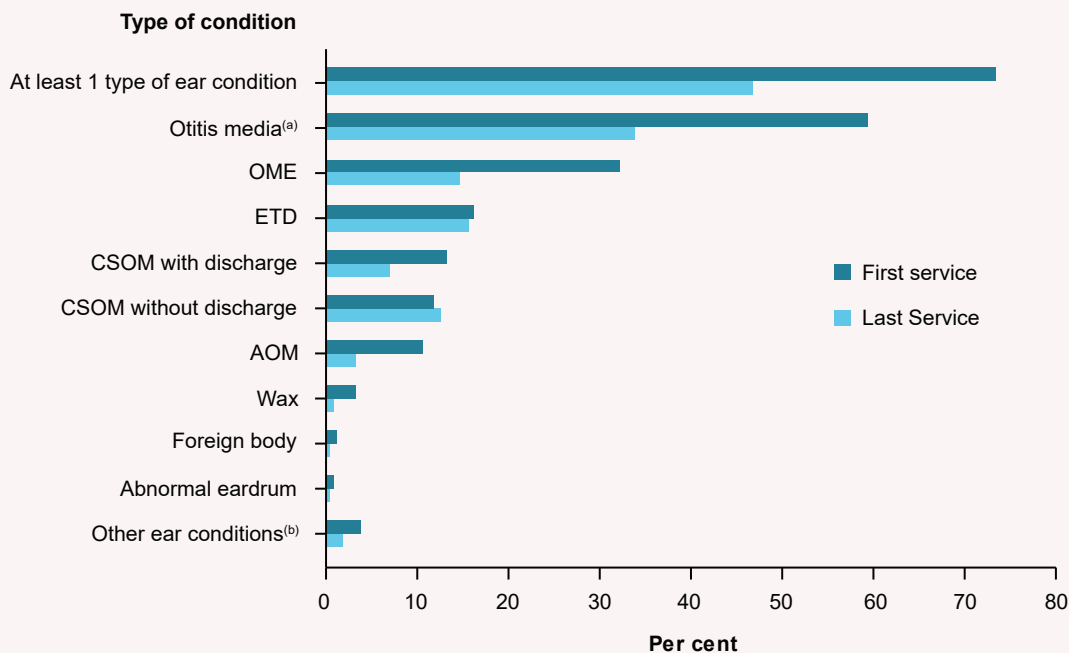
This section presents information about changes in ear conditions, hearing loss and hearing impairment in First Nations children and young people who received 2 or more audiology services during the hearing health outreach services treatment pathway. This is one way to understand the effectiveness of 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 5,363 (about 50%) First Nations children and young people met this criteria.

For almost all conditions between July 2012 and December 2022, 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 26 percentage points between the first and the last service, from 3,936 (73%) to 2,508 (47%).
- 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. For chronic suppurative otitis media without discharge, there was a slight increase in the number and proportion between first and last services, from 636 (12%) to 679 (13%), indicating an improvement for children with discharging perforations to non-discharging perforations.

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 2022



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 2022, there were 854 First Nations children and young people who received a CNS service and consented to sharing information with the AIHW. Of those, 484 (57%) were diagnosed with at least one ear condition at their first CNS visit and 323 (38%) were found to have no ear condition; information was missing for the remaining 47 (5.5%).



The most commonly diagnosed conditions were:

- Eustachian tube dysfunction (27%)
- otitis media with effusion (23%)
- acute otitis media (4.8%).

Among children who received a CNS service, the proportion diagnosed with otitis media with effusion was slightly higher in 2022 than in 2021 (23% compared with 22%).

The proportion of CNS service recipients who had Eustachian tube dysfunction was also slightly higher in 2022 than 2021 (27% compared with 25%), however, the proportion with CSOM and AOM in 2022 was lower than in 2021.

Find out more in Table S3.4.

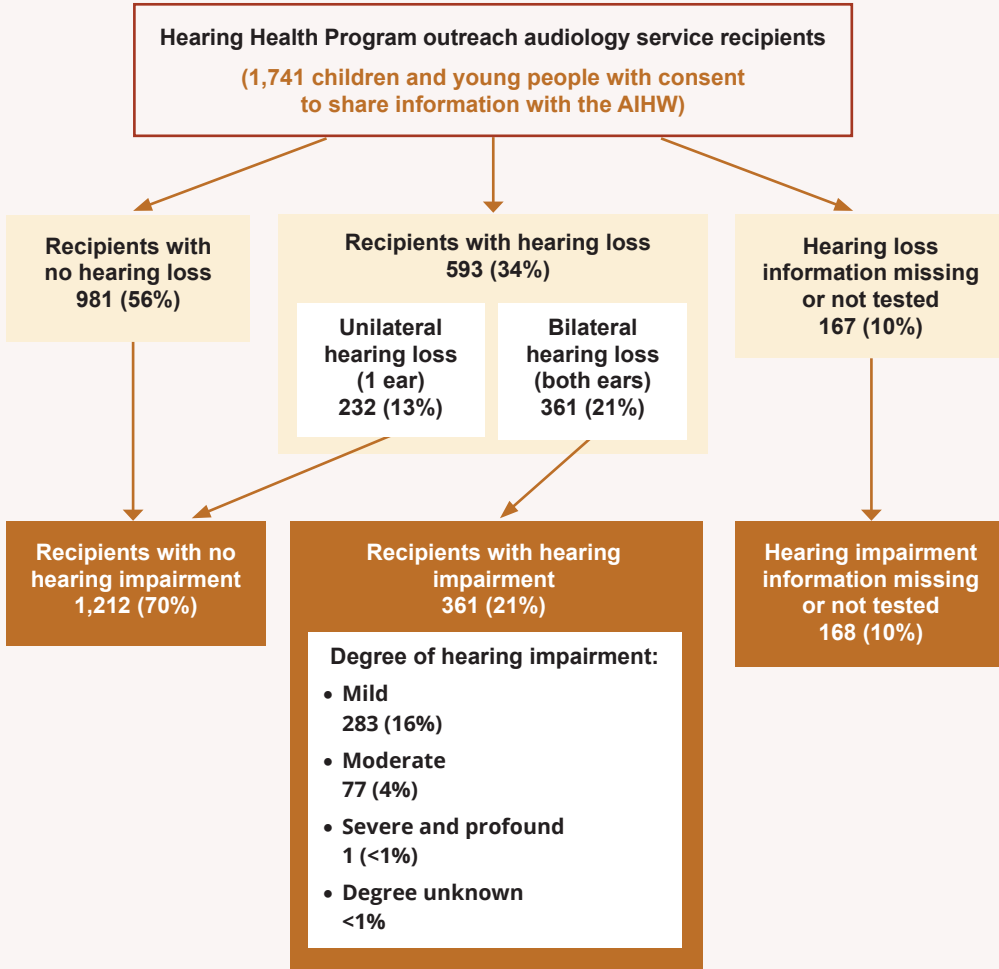
Hearing status

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 2022, 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), 2022



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 1,741 First Nations children and young people who received audiology outreach services in 2022, 593 (or 34%) had hearing loss:

- 388 (or 22%) had conductive hearing loss
- 16 (or 0.9%) had sensorineural hearing loss
- 19 (or 1.1%) had mixed hearing loss
- 170 (or 9.8%) had some form of hearing loss but type could not be determined.

Among the 1,741 First Nations children and young people who received audiology outreach 1,112 (or 64%) were visited by CNSs in 2022. Among these children, 453 (about 41%) had some form of hearing loss—26% bilateral and 15% unilateral.

The proportion of children with hearing loss who received both audiology and CNS services, decreased by 38 percentage points between July 2012 and December 2022 (from 79% to 41%).

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 2022, 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.

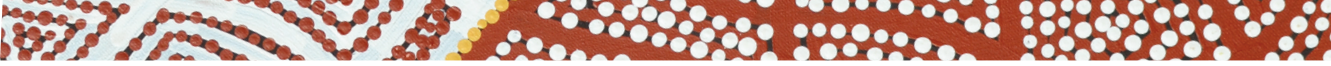
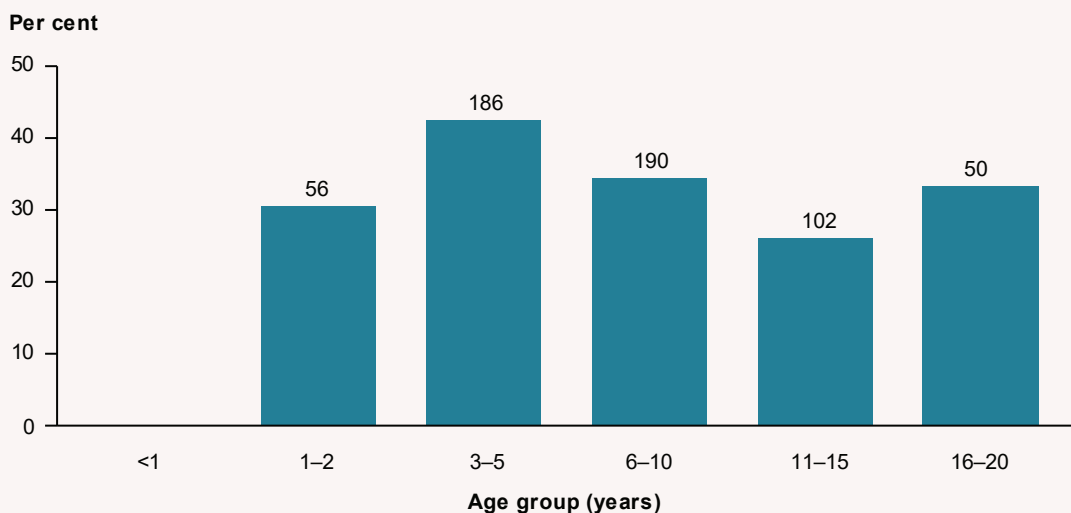


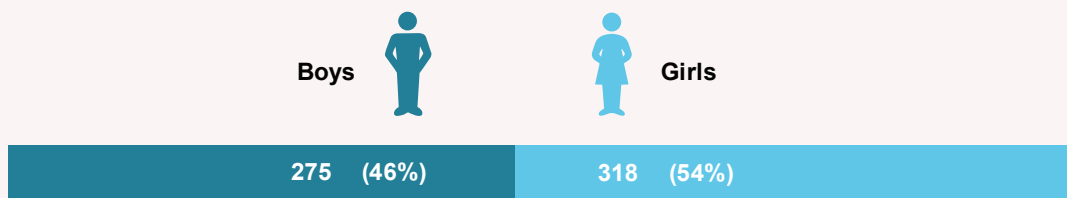
Figure 3.5: Proportion of children and young people with hearing loss who received audiology services in 2022, by age group



Note: Proportion calculated with the denominator as the total number of service recipients in the relevant age group.
Source: Table S3.9.

Among the 593 children who received an audiology service in 2022 and had hearing loss, a slightly higher proportion were girls (Figure 3.6).

Figure 3.6: Hearing loss among children and young people in 2022, by sex

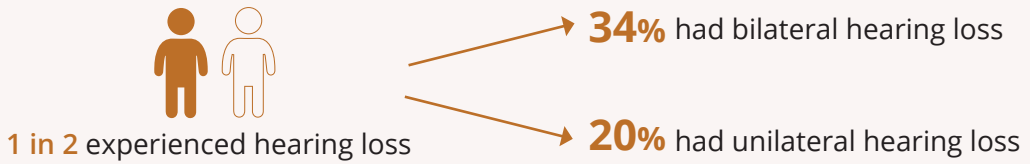


Hearing loss among children and young people with ear conditions

First Nations children and young people who had ear conditions were more likely to have hearing loss than those with no ear conditions (53% compared with 9% in 2022) (see Table S3.10). Among those with at least one ear condition, 34% had bilateral hearing loss and a further 20% had unilateral hearing loss (Figure 3.7).

Figure 3.7: Hearing loss among children and young people in 2022 with ear conditions

In **2022**, among children who were diagnosed with **at least 1** ear condition:



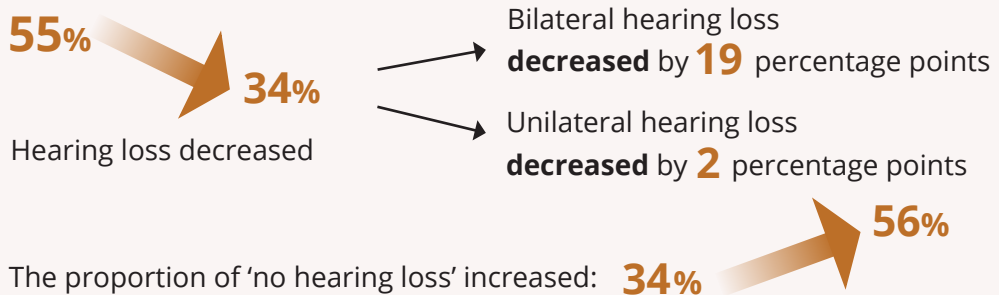
Source: Table S3.10.

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 2022 (Figure 3.8).

Figure 3.8: Hearing loss among service recipients over time

When comparing service recipients from July–December 2012 and 2022:



Note: Information on hearing loss status was 'missing' for between 7.4% 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.

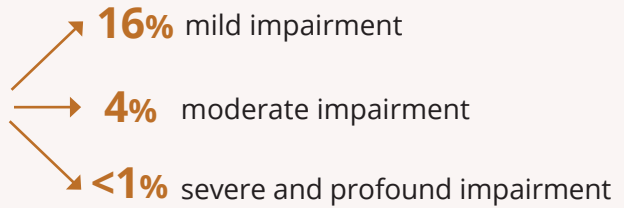
Hearing impairment

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 2022, 361 (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 2022

In 2022

361 service recipients
had a hearing impairment

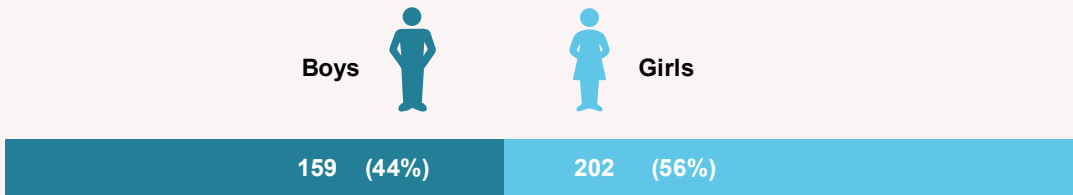


Source: Table S3.7.

Variation by age and sex

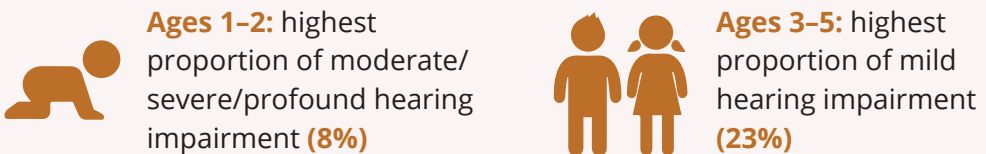
In 2022, among the 361 First Nations children and young people who received an audiology service and had a hearing impairment, a slightly higher proportion were girls (Figure 3.10).

Figure 3.10: Hearing impairment in 2022, by sex



In 2022, 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 2022 for younger ages



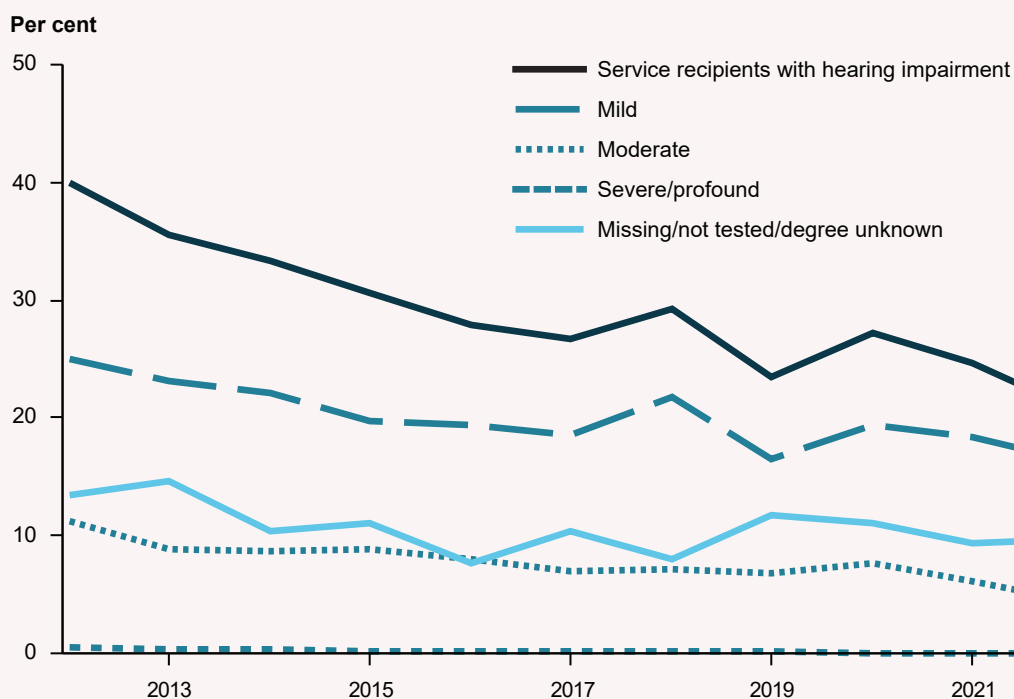
Source: Table S3.11.

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 2022 (Figure 3.12).

Figure 3.12: Degree of hearing impairment among children and young people, July 2012 to December 2022



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 and medical interventions. 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.

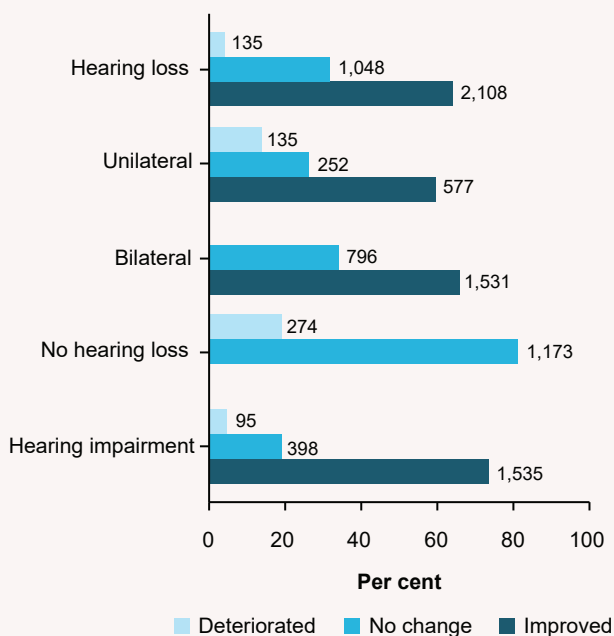
Changes among children who received 2 or more services between 2012 and 2022

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 4,738 First Nations children and young people who received 2 or more outreach audiology services between July 2012 and December 2022, hearing health generally improved over the period (Figure 3.13):

- Among 3,291 children with hearing loss, 2,108 children (64%) had an improved hearing loss status, 1,048 (32%) had no change in status, and 135 (4%) had deteriorated hearing loss status.
- Among the 1,447 children with no hearing loss, 1,173 (81%) had no change in status and 274 (19%) had deteriorated hearing status.
- Among the 2,092 children with hearing impairment, 1,535 (73%) had improved capability and for 95 (5%) 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 2022



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).



A number of 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.

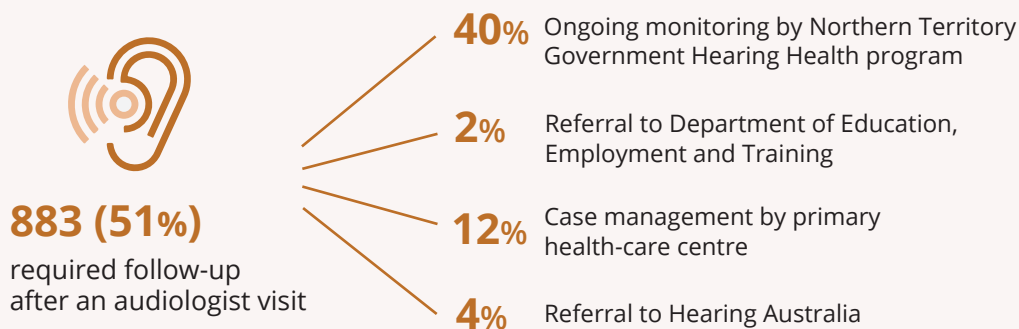
In addition to these hearing health services, children can be referred to other follow-up services. Follow-up can encompass a wide range of services, from having a hearing aid fitted by Hearing Australia, to medical treatment such as ear cleaning or the need for ENT surgery.

Follow-up services required after audiologist visits

In 2022, among 1,741 First Nations children and young people receiving an audiology service, 51% required at least 1 further action for follow-up. (Percentages in the infographic Figure 4.1 below sum to over 51% because some children required more than 1 referral).

Figure 4.1: Follow-up services required after audiologist visits

In 2022, 1,741 children and young people received an audiology service. Among these:



Source: Table S4.1.

Follow-up services required after ENT teleotology services

In 2022, among First Nations children and young people receiving an ENT teleotology service, 64% (or 328 children) 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:

- 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.

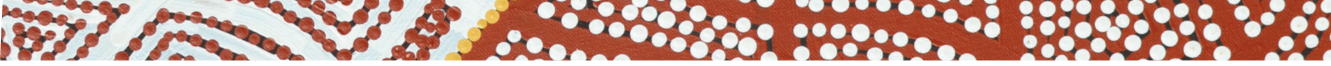
At the end of 2022, there were 5,549 First Nations children on the waiting list, which is about 50% of total First Nations children and young people who were in the programs. Among them, 3,265 (or 59%) First Nations children and young people were on the audiology waiting list. Of these, 1,903 (or 34%) were new referrals for audiology services and 1,362 (or 25%) were recalls for further audiology follow-up.

In addition, 2,284 (or 41%) First Nations children and young people were waiting for ENT teleotology services in the Northern Territory. Of these, 905 (or 16%) were new referrals either from Primary Health Care physicians or identified through the audiology pathway and required ENT intervention. There were 1,379 (or 25%) children and young people who had been reviewed but required additional follow-up by ENT teleotology services.



5

Regional analysis



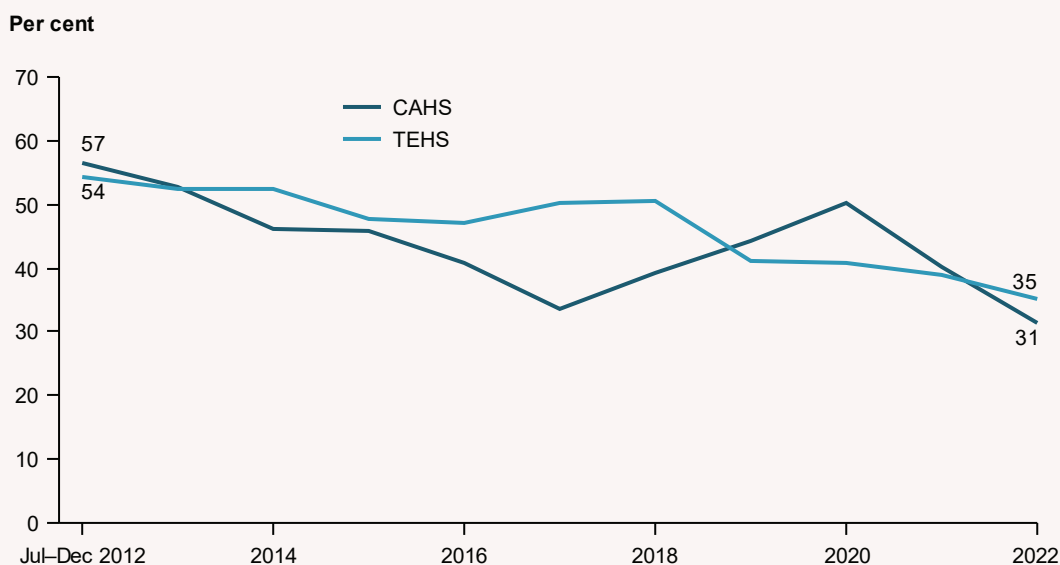
The Northern Territory reports service delivery data for two regions: the Top End Health Service (TEHS) and the Central Australia Health Service (CAHS). This section presents data from annual snapshots of the hearing health status of the children and young people who received outreach audiology, CNS or ENT teleotology services in these 2 regions from 2012 to 2022. In 2022, 1,267 First Nations children and young people within the TEHS and 474 within the CAHS received an audiology service.

Hearing loss

Rates of hearing loss were generally similar for children in the TEHS and the CAHS between July 2012 and December 2016. However, in 2017 the difference in the proportion of children with hearing loss grew between the regions. In 2020, the gap between the TEHS and the CAHS widened, before narrowing again in 2022 (Figure 5.1). In 2022:

- There was a slightly lower proportion of hearing loss (31%, or 149 children) of First Nations children in the CAHS than those in the TEHS (35%, or 444 children).

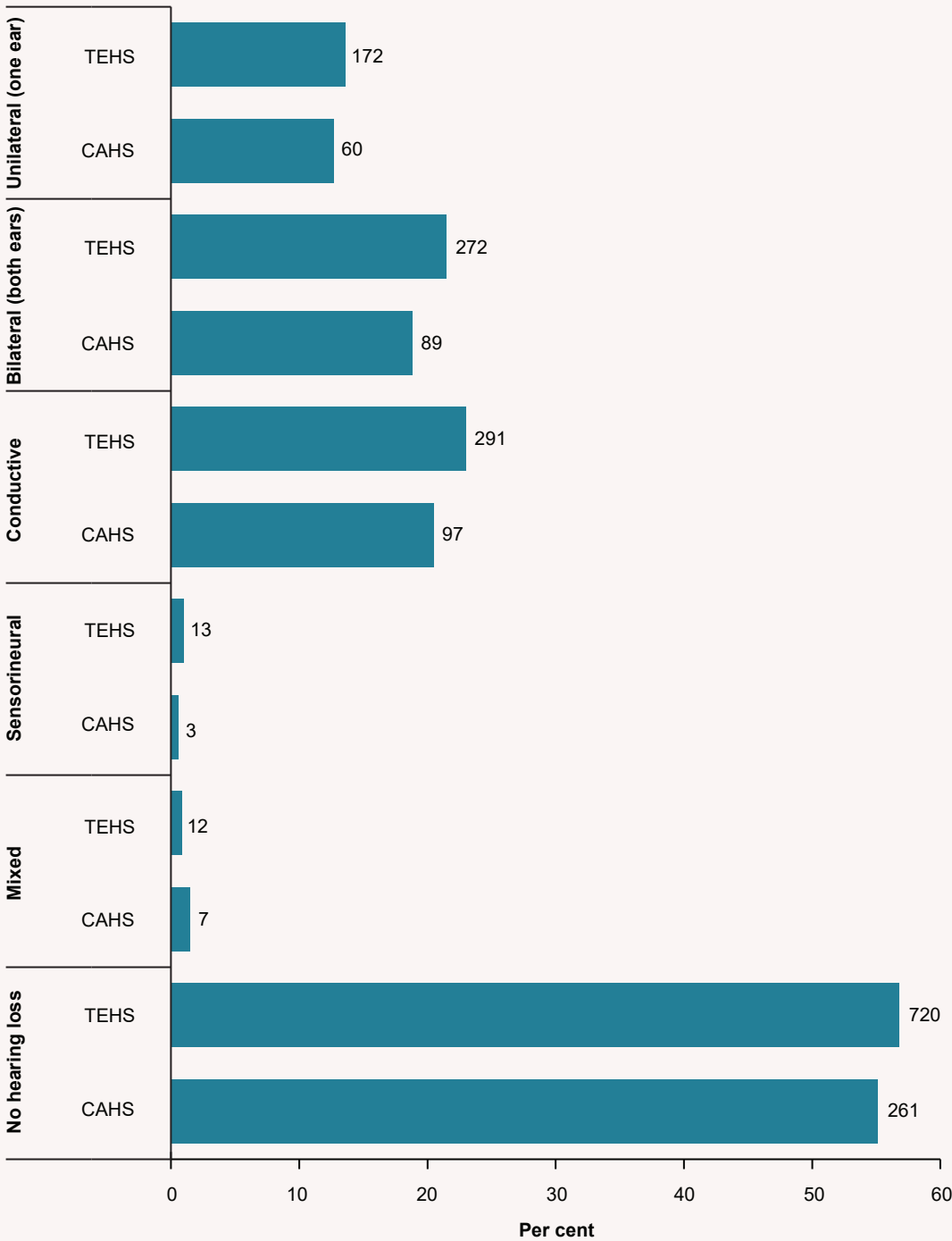
Figure 5.1: Hearing loss among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), July 2012 to December 2022



Source: Table S5.1.

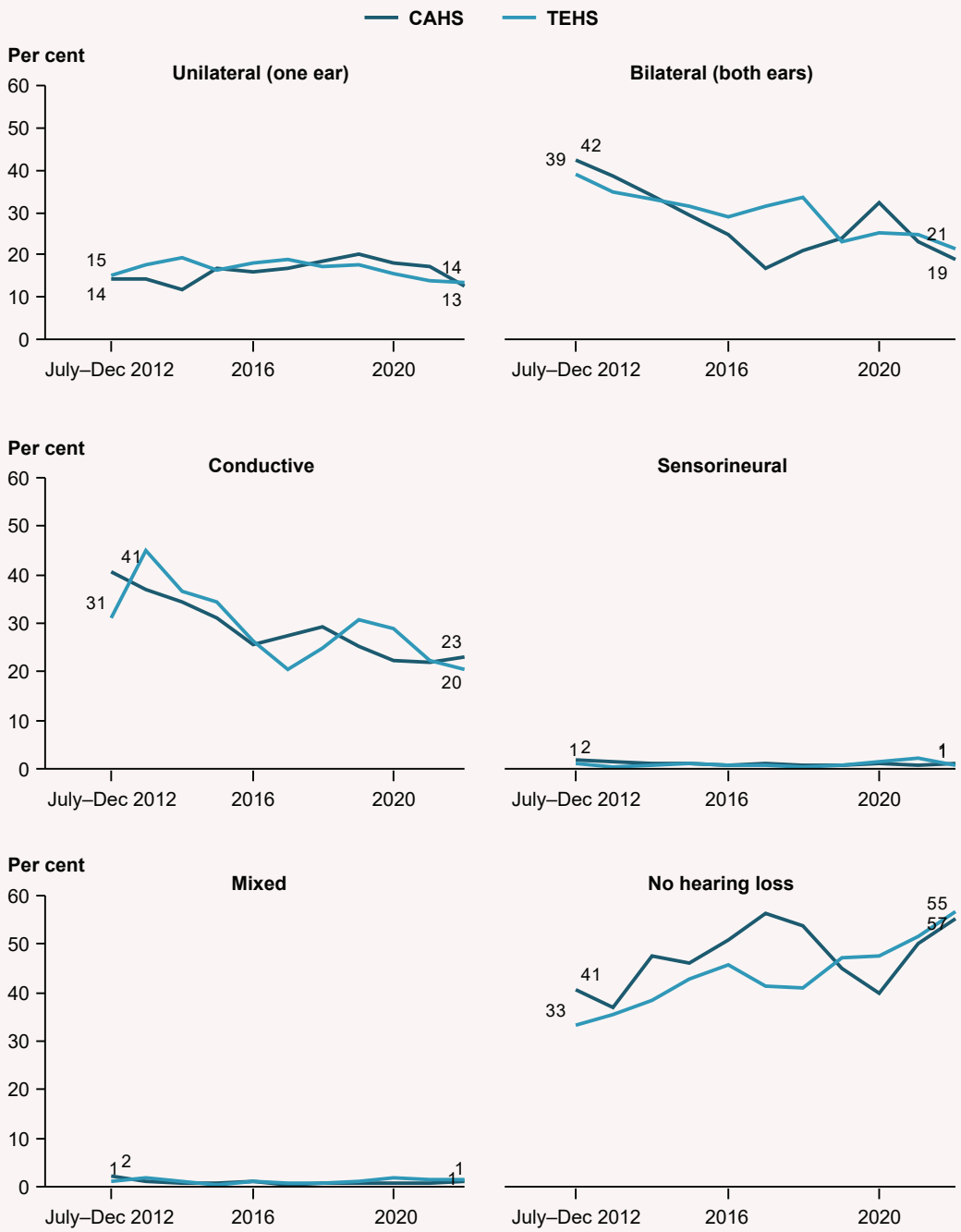
When looking at specific types of hearing loss in 2022 (Figure 5.2), the proportions between children in the TEHS and the CAHS show smaller differences.

Figure 5.2a: Types of hearing loss among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), 2022



Source: Tables S5.1 and S5.2.

Figure 5.2b: Types of hearing loss among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), July 2012 to December 2022



Sources: Tables S5.1 and S5.2.

Hearing impairment

Overall, for both TEHS and CAHS from July 2012 to December 2022:

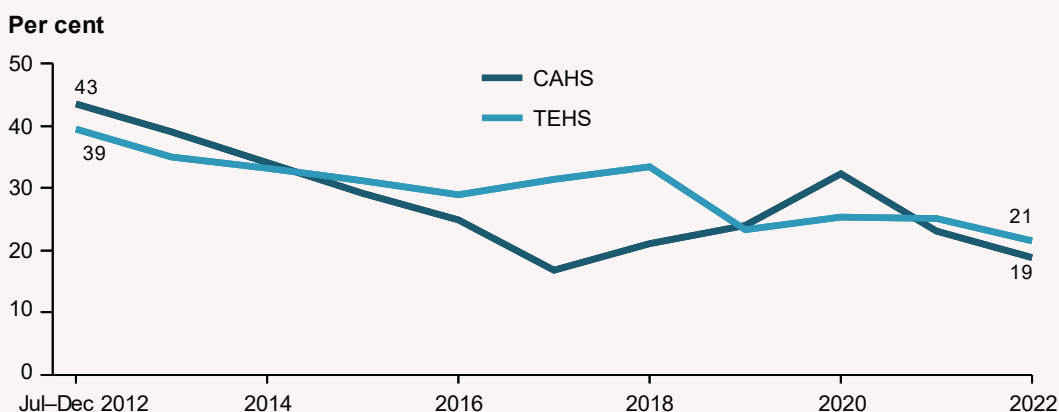
- the proportion of First Nations children and young people with hearing impairment decreased over time, (Figure 5.3) by:
 - 18 percentage points for the TEHS
 - 25 percentage points for the CAHS
- the proportion of First Nations children and young people with no hearing impairment increased over the years by:
 - 22 percentage points for the TEHS
 - 13 percentage points for the CAHS.

From July 2012 to December 2016, hearing impairment patterns across the years were similar for First Nations children and young people who received services in the TEHS and the CAHS, but there was a deviation from these patterns from 2017.

In 2019, there was a similar proportions of hearing impairment among children and young people in the TEHS and CAHS had similar proportions of hearing impairment. The gap widened in 2020 and then narrowed again in 2021. In 2022, 19% of First Nations children and young people receiving audiology services in CAHS had hearing impairment, compared with 21% of those in TEHS (Figure 5.3).

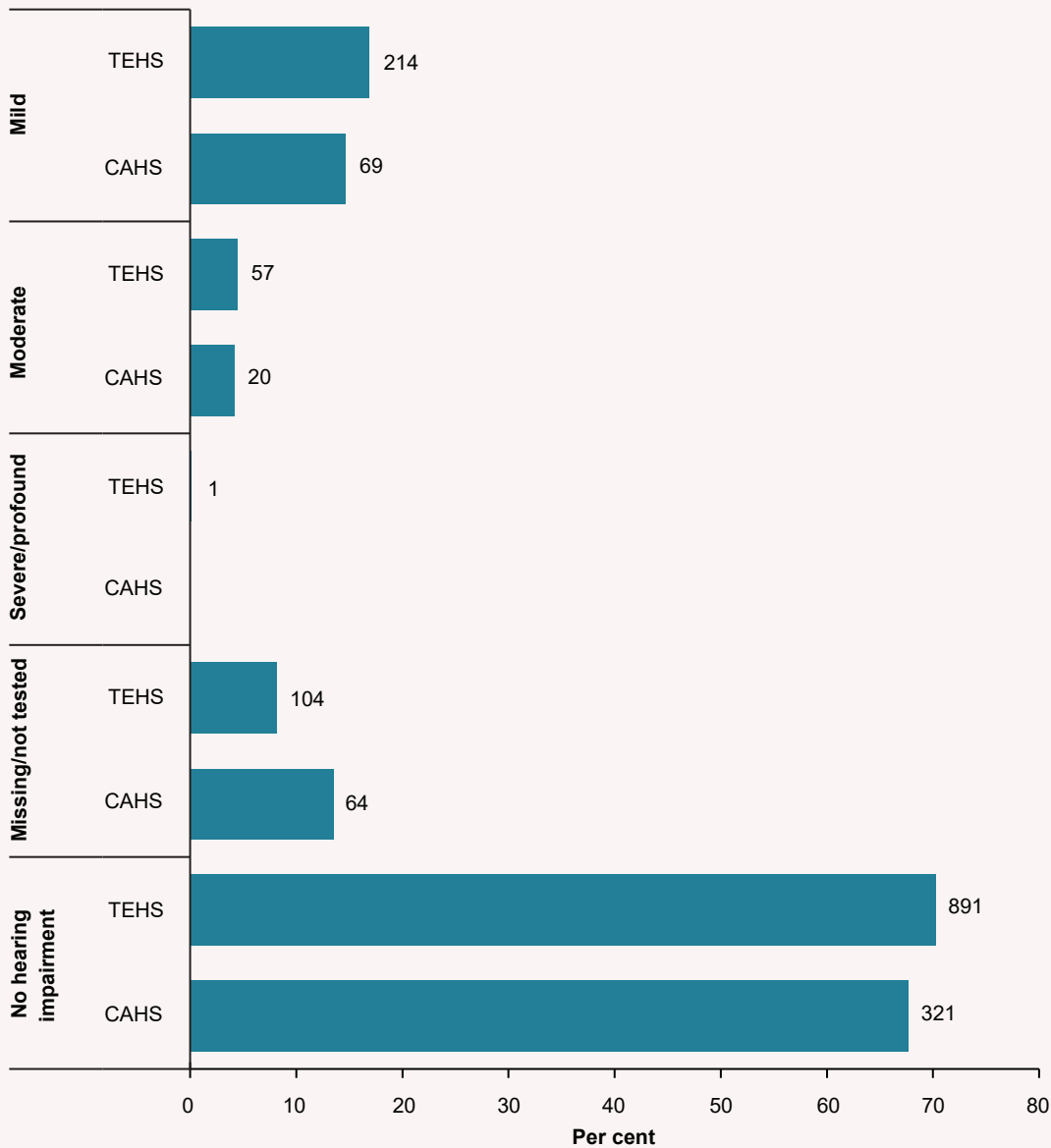
In 2022, proportions of children and young people with mild hearing impairment were slightly higher in TEHS (17% compared with 15%). The proportions of children with moderate hearing impairment were also slightly higher in the TEHS than in the CAHS (5% compared with 4%) (Figure 5.4).

Figure 5.3: Hearing impairment among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), July 2012 to December 2022



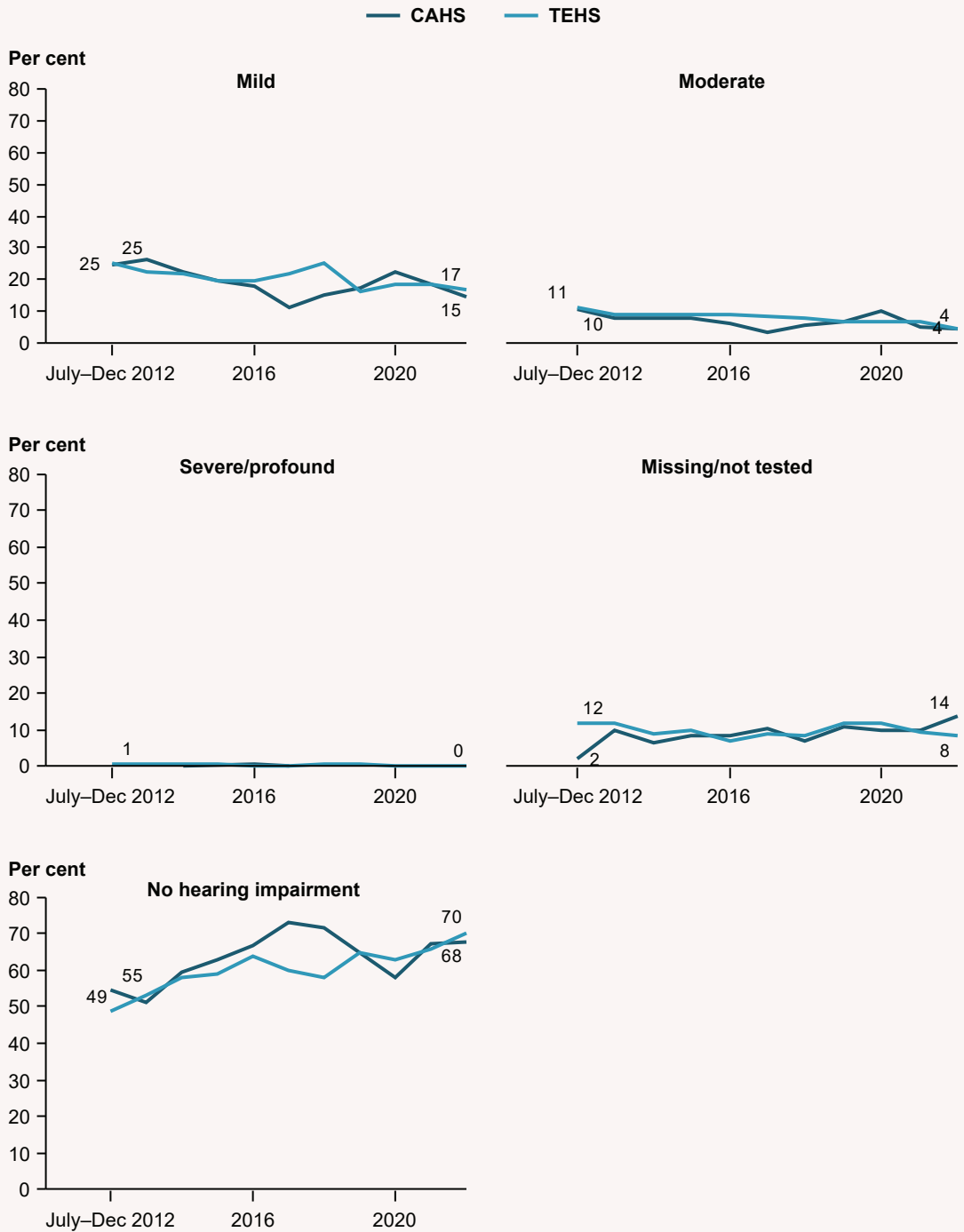
Source: Table S5.3.

Figure 5.4a: Types of hearing impairment among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), 2022



Source: Table S5.3.

Figure 5.4b: Types of hearing impairment among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), July 2012 to December 2022

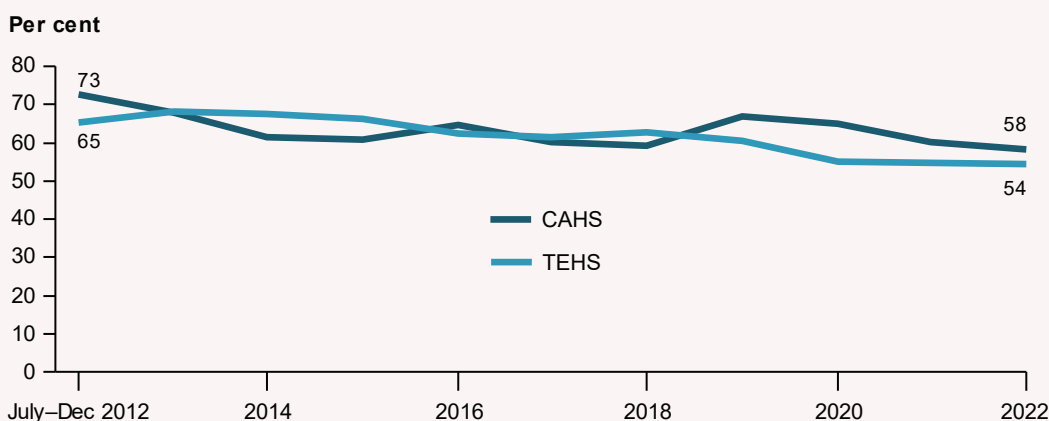


Source: Table S5.3.

Ear conditions

Between July 2012 and December 2022, 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 decreased overall in both regions—from 65% to 54% in the TEHS and from 73% to 58% in the CAHS (Figure 5.5).

Figure 5.5: Presence of ear conditions among children and young people who received outreach audiology, CNS or ENT teleotology services in the Top End (TEHS) and Central Australia (CAHS), July 2012 to December 2022

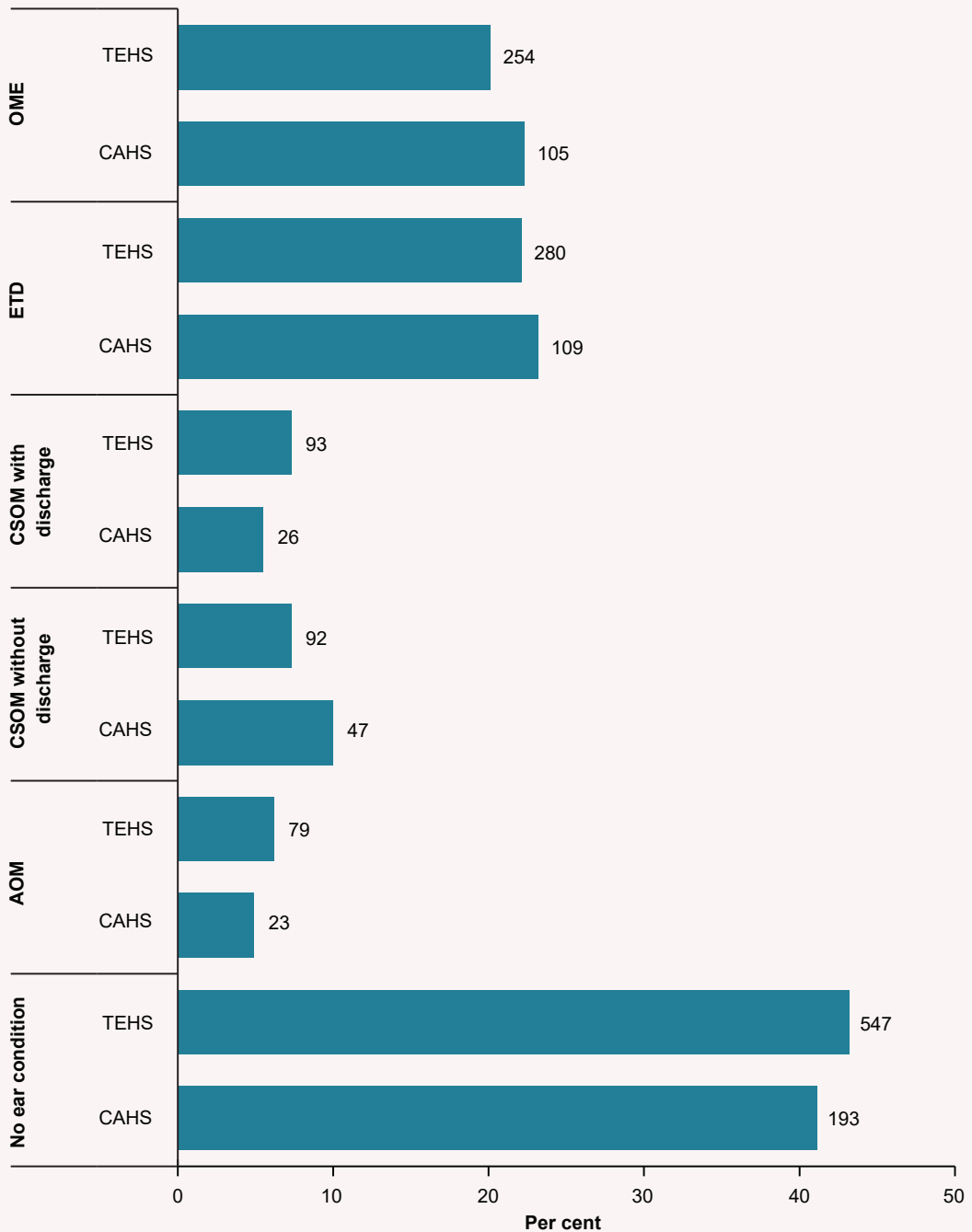


Source: Table S5.4.

The distribution of types of ear condition varied over time in both regions (Figure 5.6). For example, from July 2012 to December 2022:

- the proportion of First Nations children with otitis media with effusion increased in the TEHS between 2012 and 2014 (from 21% to 29%), before decreasing and then remaining relatively steady at around 24% to 25% between 2016 and 2020, and falling to 22% in 2021 and was 20% in 2022. In the CAHS, the proportion decreased between 2012 and 2013 (from 36% to 29%), and ranged between 18% (in 2017) and 25% (in 2020), and falling to 23% in 2021 and was 22% in 2022.
- the proportion of First Nations children with chronic suppurative otitis media with discharge decreased in the TEHS, from 17% in 2012 to 7% in 2022. In the CAHS, from 2012 to 2020, the proportion fluctuated between 8% and 15%, but fell to 6% in 2022.
- in both TEHS and CAHS, the proportion of First Nations children with Eustachian tube dysfunction was highest in 2021 (25% for CAHS and 22% for TEHS). In 2022, it was 23% for CAHS and 22% for TEHS. Across the other years, it ranged between 16% and 21% for CAHS, and between 14% and 20% for TEHS.

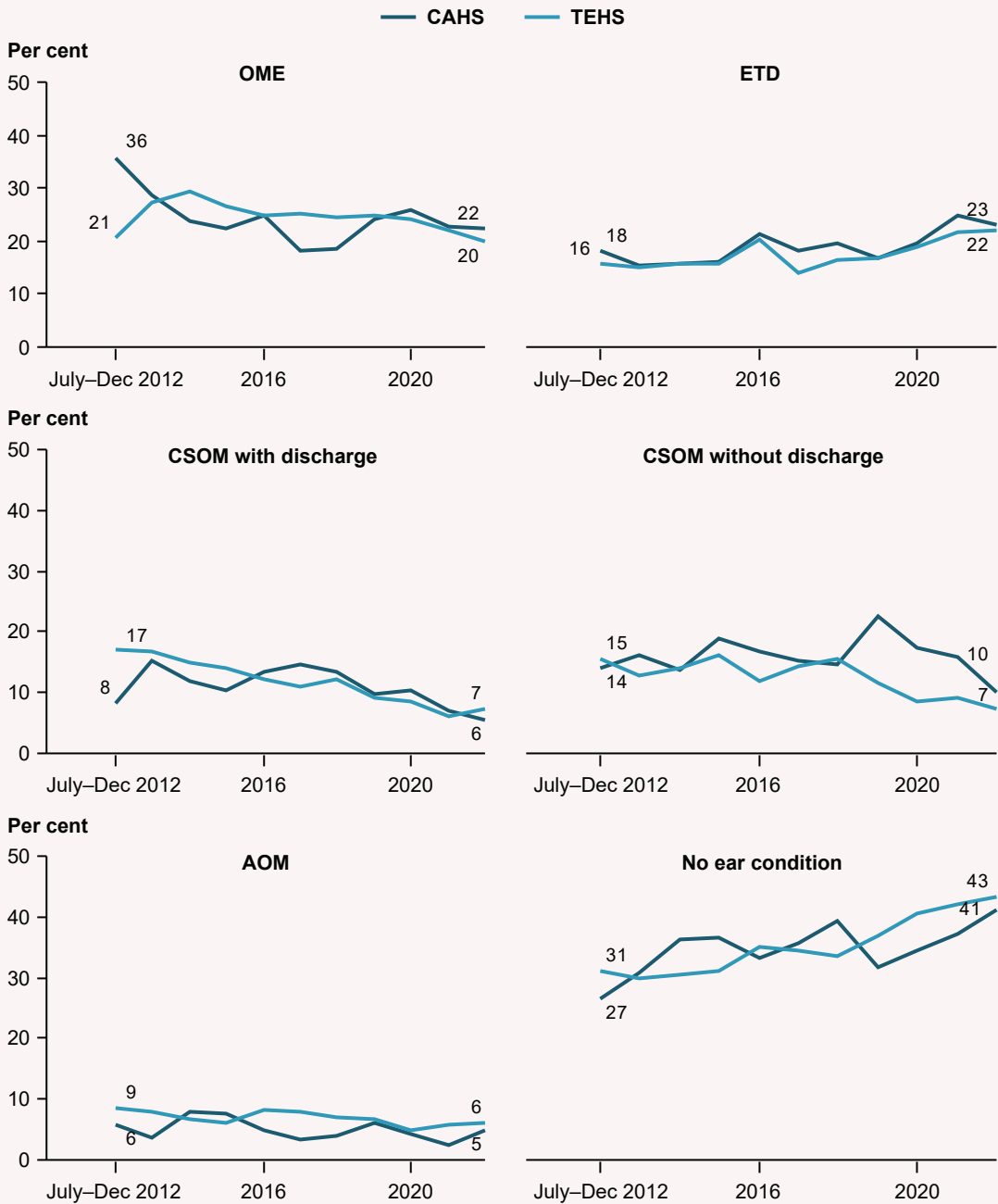
Figure 5.6a: Distribution of specific ear conditions among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), 2022



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

Source: Table S5.4.

Figure 5.6b: Distribution of specific ear conditions among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), July 2012 to December 2022



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

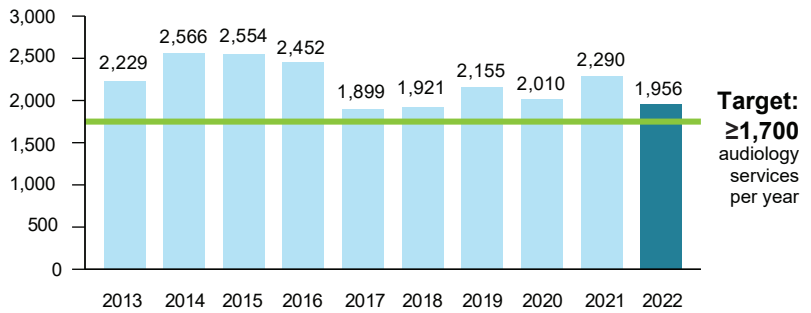
Service delivery benchmarks for hearing health service delivery are set for audiology, CNS and health promotion and training activities. These are measured by the number of services per year. In 2022, targets for all of these services were exceeded. Note that the Northern Territory Health Implementation Plan does not include targets for ENT services.

Audiology services

Indicator:
Audiology services provided

The number of **audiology services** per year

Figure 6.1: Number of audiology services provided, 2013–2022



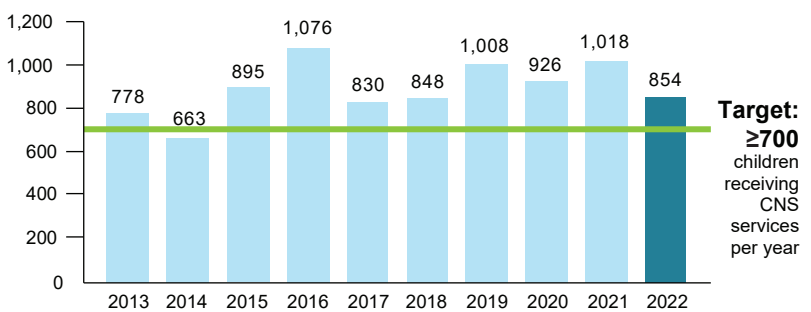
Note: Data on audiology services provided to children and young people in some years between 2013 and 2019 may differ slightly from previous reports as a result of revisions and improvements to data quality.

CNS services

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 children receiving CNS services, 2013–2022

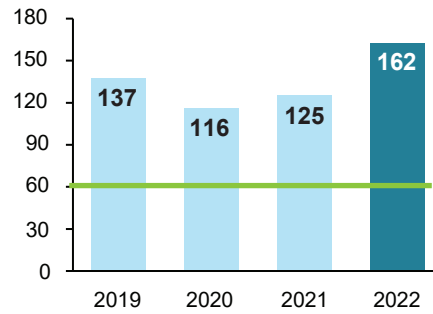


Health promotion services and activities

Indicator:
Health promotion

Delivery of hearing health promotion or training services and activities

Figure 6.3: Number of services/activities provided January 2019 to December 2022



Target:
15
preventative hearing health promotion or training services/activities for the period 1 January 2022 to 31 March 2022



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 10,100 children and young people, aged under 21, who received Northern Territory outreach audiology services between July 2012 and December 2022. This accounted for about 32% 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 10% of service participants who completed audiology assessments in 2022, 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/781502>

ENT teleotology data collection summary

- This data collection included over 4,320 children and young people who were aged under 21 and received ENT teleotology services between July 2012 and December 2022. This accounted for about 14% 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/781498>



CNS data collection summary

- The data collection includes over 6,000 children aged under 21 who received CNS services between July 2012 to December 2022. This accounted for about 18% 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/781514>

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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Special thanks go to the many clinicians and administrators who supported the hearing health data collections included in this report. The feedback, assistance and cooperation of the Northern Territory Department of Health is greatly appreciated.

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

≥	greater than or equal to
≤	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).

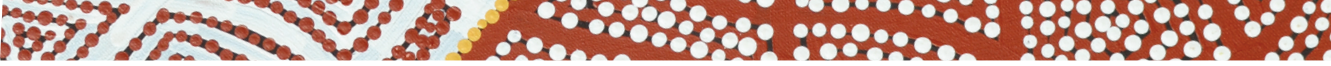
Eustachian tube dysfunction (ETD): Negative middle ear pressure associated with compromised equalisation impeding middle ear function and sometimes causing middle ear fluid accumulation.

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 non soundproof 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 non soundproof 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 non soundproof 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.

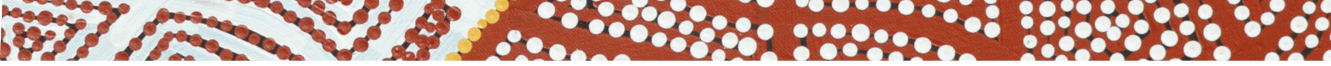
suppurative: Pus produced in response to inflammatory bacterial infections.

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 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.

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 2022 there were: 1,956 audiology services; 575 ear, nose and throat teleotology services; and 941 Clinical Nurse Specialist visits. Among children and young people who received at least 2 services between 2012 and 2022, 64% had improved hearing loss and 73% had improved hearing impairment.

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