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

July 2012 to December 2020

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December 2020

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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 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 Indigenous 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 Indigenous 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. 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 2020, and includes time trends for the period July 2012 to December 2020.

How many children received services?

- In 2020, 116 training sessions for hearing health education, promotion and prevention activities were provided to health-care staff.
- A total of 1,802 Indigenous children and young people received at least 1 audiology, Clinical Nurse Specialist (CNS), or ear, nose and throat (ENT) teleotology service in 2020. From July 2012 to December 2020, a total of 33,672 services were provided to more than 8,700 children and young people.
- In 2020, 2,010 outreach audiology services were provided to 1,772 Indigenous children and young people. From July 2012 to December 2020, a total of 18,561 services were provided to a total of 8,632 children and young people.
- 701 ENT teleotology services were provided to 639 Indigenous children and young people in 2020. From July 2012 to December 2020, a total of 7,542 services were provided to a total of 3,904 children and young people.
- In 2020, CNSs conducted 1,004 visits to 926 Indigenous children. From July 2012 to December 2020, a total of 7,569 services were provided to a total of 5,015 children.

Figure 1: Number of Indigenous children and young people who received audiology, CNS or ENT teleotology service in 2020

1,772
children and young people received **audiology** services

926
children received **CNS** services

639
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 2020

The percentage of Indigenous children and young people with at least 1 ear condition decreased by 8 percentage points, from 66% (483 of 727 children and young people) to 58% (1,037 of 1,802 children and young people).

Among children and young people who received audiology services, the proportion with hearing loss decreased by 12 percentage points, from 55% (388 of 710 children and young people) to 43% (768 of 1,772 children and young people).

Figure 2: Ear and hearing health improvements between 2012 and 2020

66% → **58%**

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

55% → **43%**

Children and young people with **hearing loss**

Sources: Tables S3.1 and S3.6.

Among 3,890 Indigenous children and young people who received at least 2 audiology services between 2012 and 2020, 2,811 had hearing loss at their first service, and of those, 1,712 (61%) had improved—this is a change from bilateral to unilateral hearing loss or from unilateral hearing loss to no hearing loss.

Between 2012 and 2020, among 1,800 Indigenous children who received at least 2 services and had hearing impairment at their first service, 1,272 (71%) 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

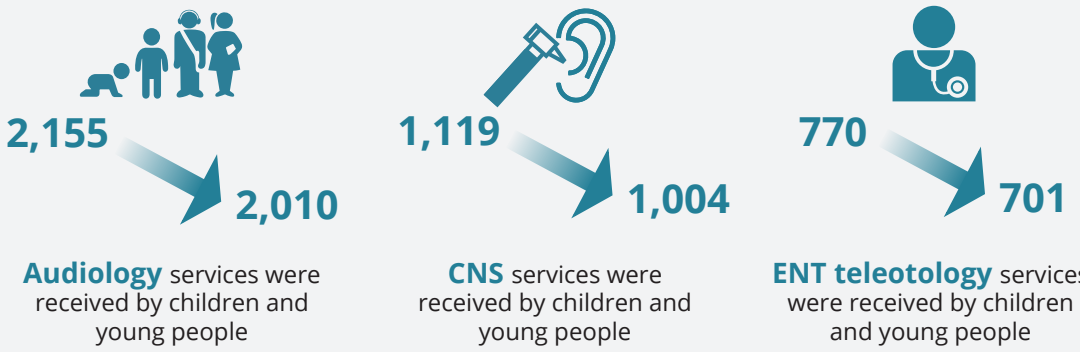
At December 2020, there were 3,109 Indigenous children and young people on the audiology waiting list. Among them, 1,407 were new referrals and 1,702 were recalled for further follow-up after receiving an initial audiology service. There were 2,000 children and young people on the waiting list for ENT teleotology services. Among them, 770 were new referrals and 1,230 were recalled for further follow-up after receiving initial ENT teleotology services.

What was the impact of COVID-19?

Across audiology, CNS and ENT, the number of services received dropped slightly between 2019 and 2020. This was largely due to a decrease in services between March and April 2020, coinciding with the introduction of restrictions imposed to control the spread of COVID-19. For example, the number of audiology checks for Indigenous children and young people in February 2020 was 284—decreasing to 204 in March 2020, and then less than 5 services in April 2020.

Figure 3: Impact of COVID-19 on number of services

Between 2019 and 2020, the number of services dropped slightly:



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

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. From 2015 to 2020, targets for these services were either met or exceeded.

Health outcomes in this program are measured every 3 years (July 2012 – June 2015, July 2015 – December 2018 and January 2019 – December 2021). All benchmarks in the first 2 periods were met. For the third period, data for 2 of the 3 years are available (that is, for 2019 and 2020). Data for these 2 years provide an indication of progress towards the

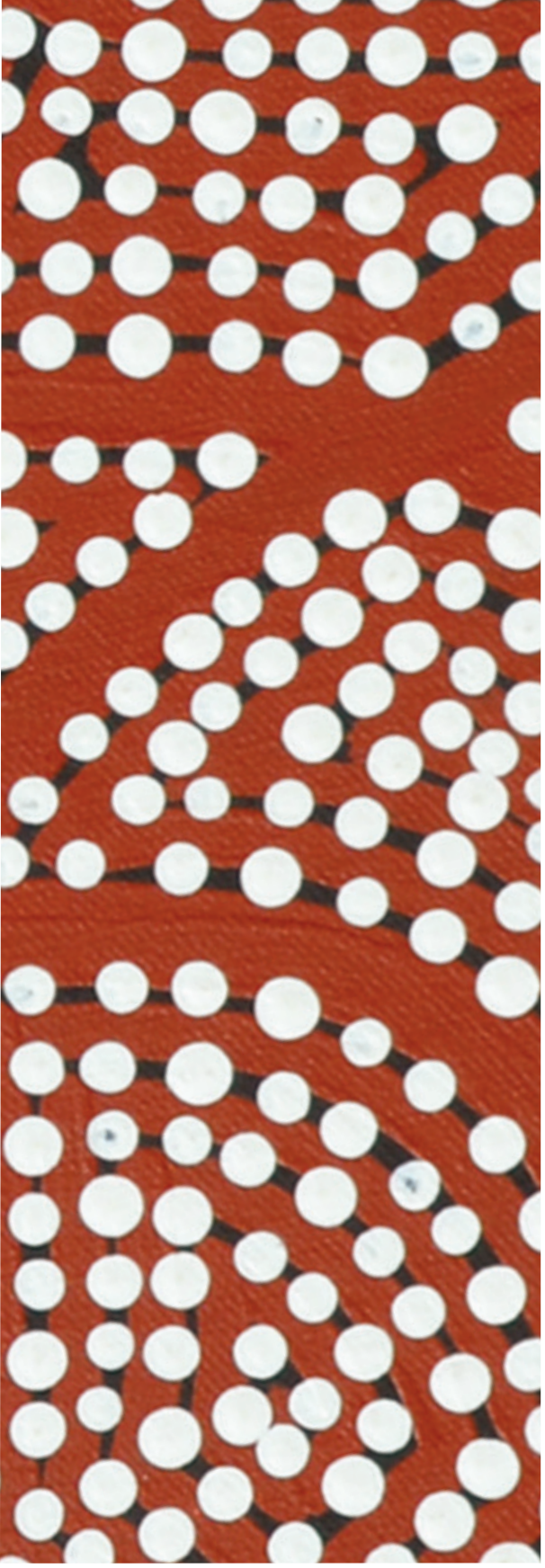
targets, but cannot be used to determine whether the targets have been met (since 2021 data are not yet available). Based on 2019 and 2020 data, the hearing impairment target is on track to be met. Of the 4 targets related to middle ear conditions, progress towards 1 target—children aged 6–15 with chronic suppurative otitis media (CSOM)—is on track, though by a small margin (0.2 percentage points).

Progress against benchmarks is presented in Table 1.

Table 1: Progress against benchmarks, 2020

Target	Outcome
Service delivery targets	
At least 1,700 audiology services per year	2,010 audiology services provided in 2020
At least 700 children receiving CNS services per year	926 children received CNS services in 2020
At least 60 hearing health promotion or training services/activities per year	116 hearing health promotion or training services and activities provided in 2020
Health outcome targets—hearing impairment	
Less than 7.5% of children tested with moderate/severe conductive hearing impairment, Jan 2019–June 2021	3% of children tested with moderate/severe conductive hearing impairment, Jan 2019–Dec 2020
Health outcome targets—middle ear conditions	
Less than 7% of children (0–5) with CSOM, Jan 2019– June 2021	7.8% of children (0–5) with CSOM, Jan 2019–Dec 2020
Less than 7% of children (6–15) with CSOM, Jan 2019–June 2021	6.8% of children (6–15) with CSOM, Jan 2019–Dec 2020
Less than 5% of children (0–5) with dry perforation, Jan 2019– June 2021	6.9% of children (0–5) with dry perforation, Jan 2019–Dec 2020
Less than 9% of children (6–15) with dry perforation, Jan 2019– June 2021	13.9% of children (6–15) with dry perforation, Jan 2019–Dec 2020

CNS = Clinical Nurse Specialist; CSOM = chronic suppurative otitis media



1

Introduction

Why is ear and hearing health important?

Hearing loss is more prevalent among Aboriginal and Torres Strait Islander people than among non-Indigenous Australians, and continues to be an important health and social issue. In 2018–19, Indigenous children aged 0–14 were twice as likely to have a long-term ear/hearing problem than non-Indigenous children, and 3 times as likely to have 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 1 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 Indigenous 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 Indigenous 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 communitities 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
- 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 Indigenous families
- the vast geographical spread of Indigenous 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 unconcious 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 Indigenous 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 Aboriginal and Torres Strait Islander 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 new National Partnership on Northern Territory Remote Aboriginal Investment (NTRAI).

The Australian Government also funds the Northern Territory Government to deliver services through the Healthy Ears—Better Hearing, Better Listening Program. The Northern Territory Government uses this funding to support ENT teleotology services that are part of the hearing health outreach 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):

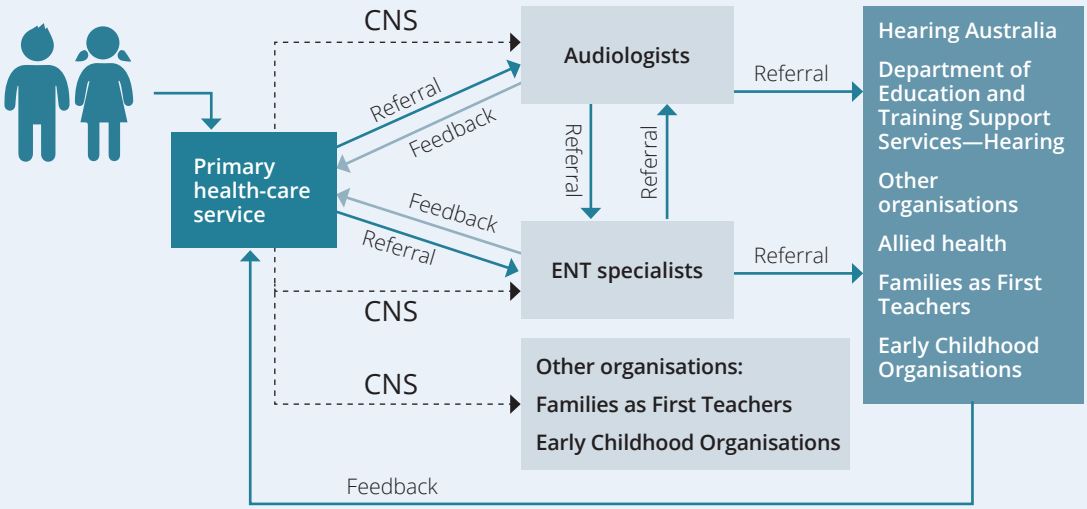
1. Health education, promotion and prevention
2. Outreach audiology
3. ENT teleotology
4. Clinical Nurse Specialists (CNS)—Case Management and Health Promotion.

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

The hearing health outreach services are available to all Indigenous children and young people aged under 21 in the Northern Territory. In 2020, there were an estimated 30,056 Indigenous Australians 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 2020 on hearing health outreach services provided to the Aboriginal and Torres Strait Islander 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 Indigenous 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 2019*, 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-nt/data.

About the data in this report

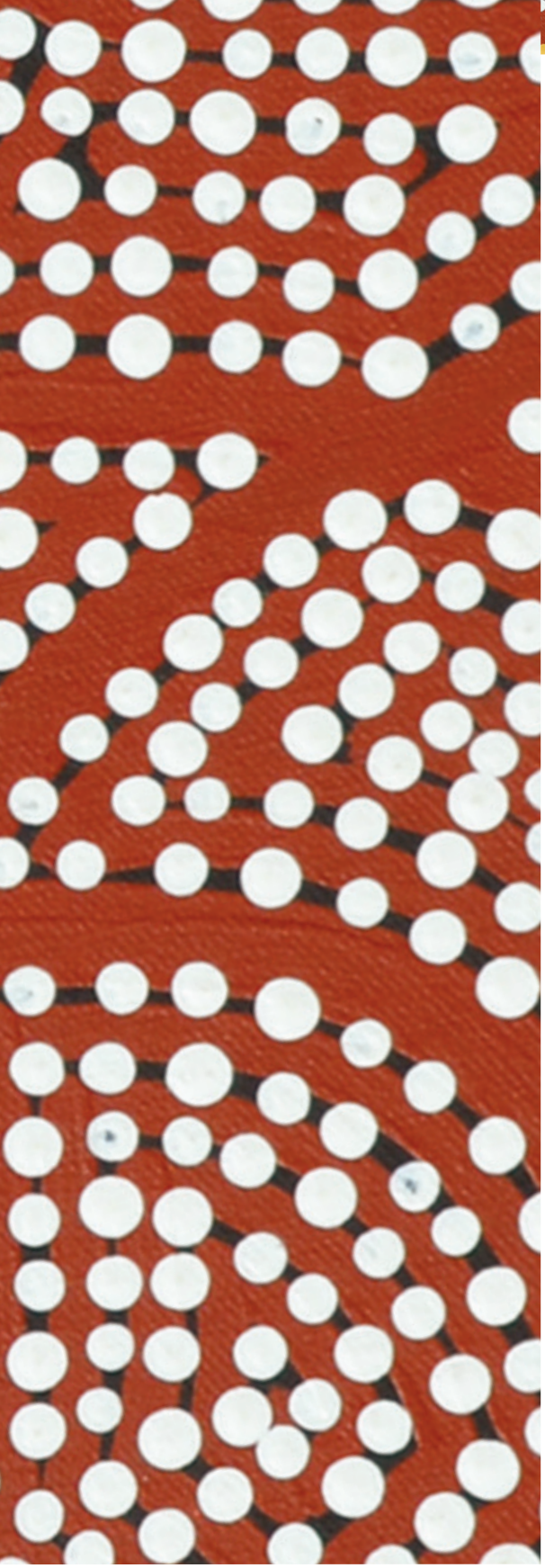
The data used in this report are collected from the hearing health outreach services funded by the Department of Health. The data refer to almost 8,700 Indigenous children and young people aged under 21 who received services between July 2012 and December 2020. This accounts for approximately 29% of the Northern Territory Indigenous 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.

[Note: Improvements made to reporting the data have resulted in some minor differences in overall numbers between this report and previous reports. Time series and historical data from 2012 to 2019 for audiology and total services and service recipients differ from previous reports due to data quality refinements. These changes have not affected outcome benchmarks, and have not affected meeting of service delivery targets.]



2

Service delivery

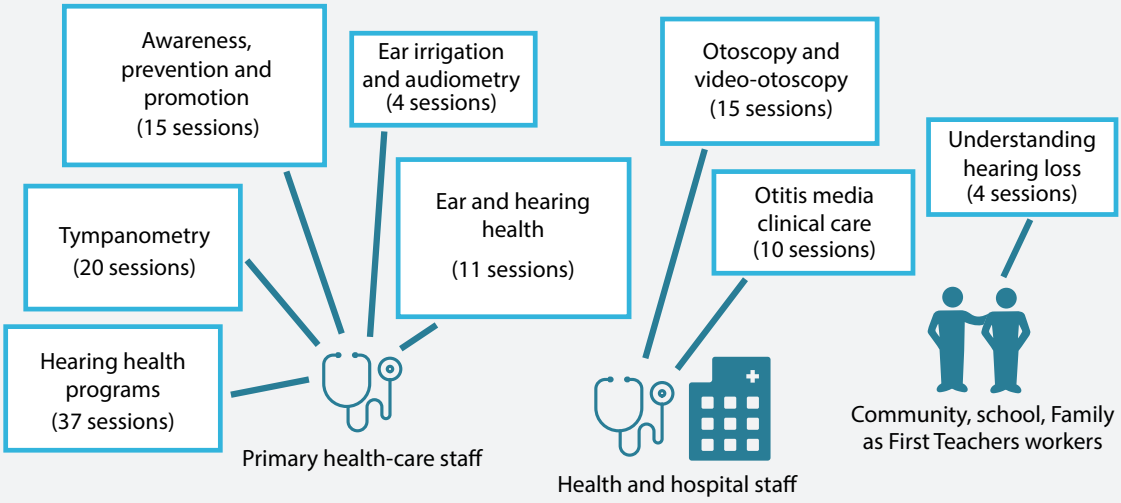
Health education, promotion and prevention

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 Aboriginal 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 2020, 116 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.

Figure 2.1: Ear health education, promotion and prevention training sessions delivered in 2020



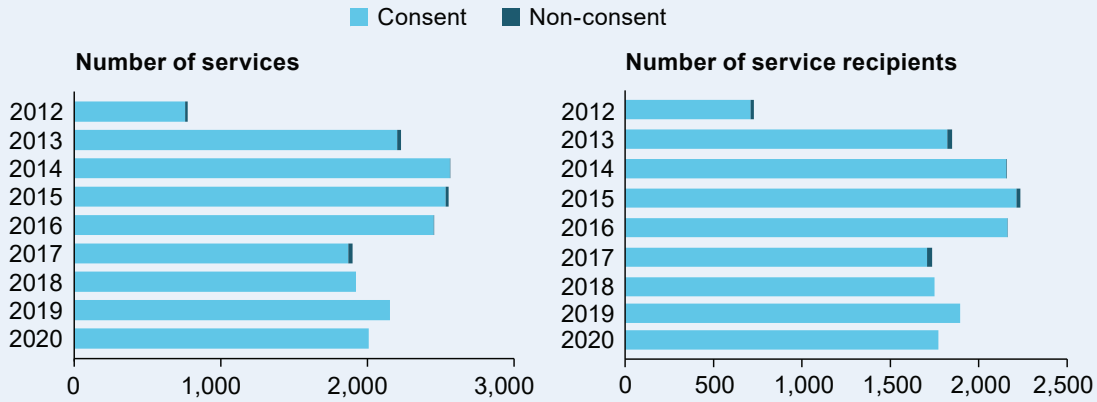
Outreach audiology

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 1 other member of staff such as a registered nurse or Aboriginal 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 2020, 2,010 audiology services were provided to 1,772 service recipients (Figure 2.2).
- From July 2012 to December 2020, a total of 18,561 services were provided to a total of 8,632 service recipients.
- The numbers of audiology services and service recipients decreased slightly between 2019 and 2020.

Figure 2.2: Number of outreach audiology services and service recipients, July 2012 to December 2020



Notes:

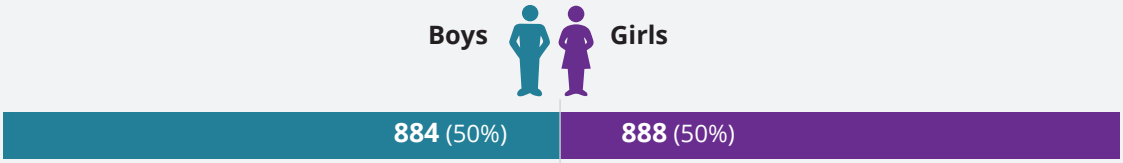
1. The total number of service recipients in July 2012 to December 2020 combined does not sum to the calendar years because some children and young people received services in multiple calendar years; these services recipients were counted only once in the total.
2. Data include service recipients aged 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 in 2020 there were no cases of non-consent for audiology service recipients.

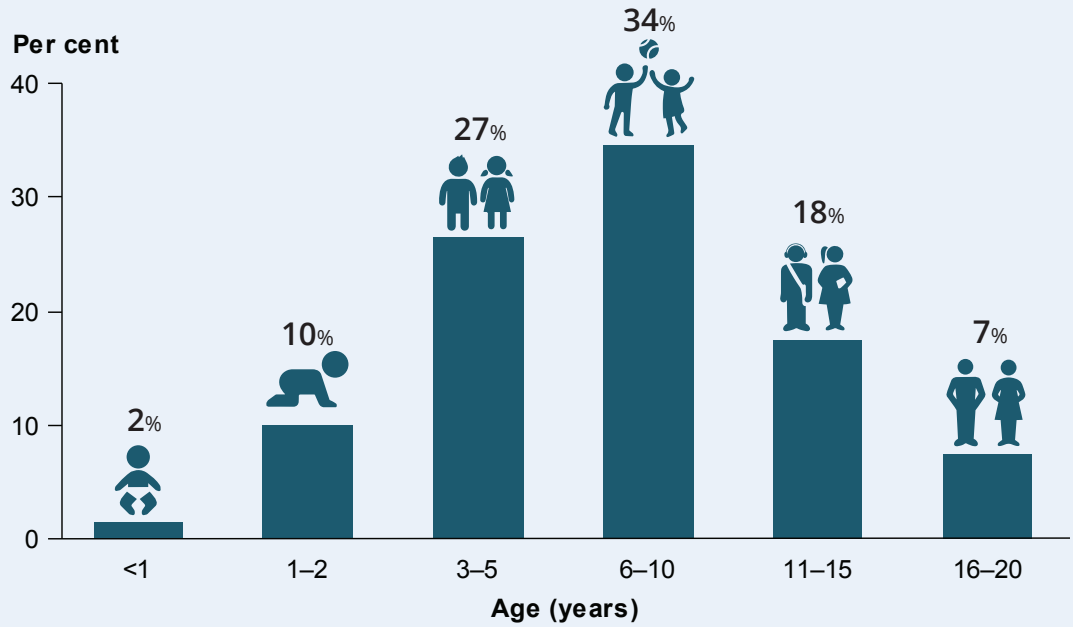
In 2020, similar numbers of girls and boys received audiology services (888 and 884, respectively) (Figure 2.3).

Figure 2.3: Outreach audiology service recipients in 2020, by sex



In 2020, about 1 in 3 (34%) service recipients were aged 6–10 (Figure 2.4).

Figure 2.4: Age of outreach audiology service recipients in 2020



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.

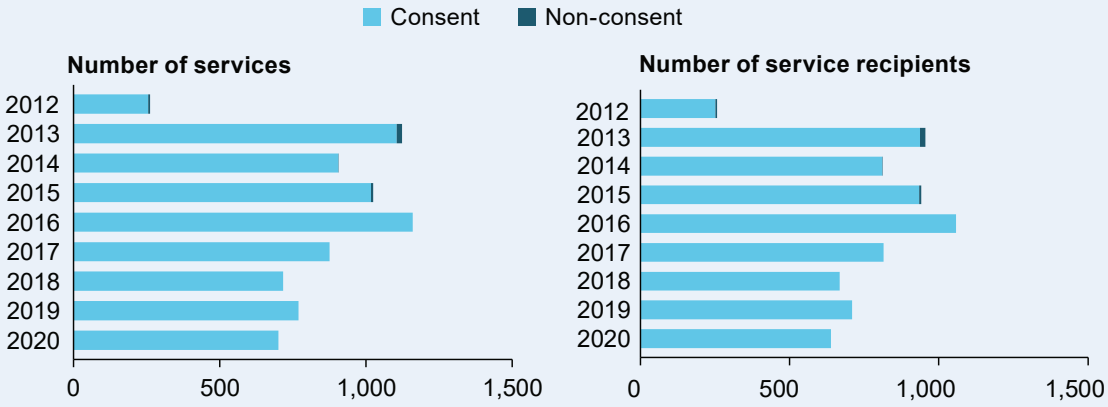
ENT teleotology services

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 be away from the community for specialist appointments. These services also increase access to ENT services for children and reduce the burden on teritiary centres where demand for ENT services is high.

- In 2020, 701 ENT teleotology services were provided to 639 service recipients (Figure 2.5).
- From July 2012 to December 2020, a total of 7,542 services were provided to a total of 3,904 service recipients.
- The numbers of ENT services and service recipients decreased slightly between 2019 and 2020.

Figure 2.5: Number of ENT teleotology services and service recipients, July 2012 to December 2020



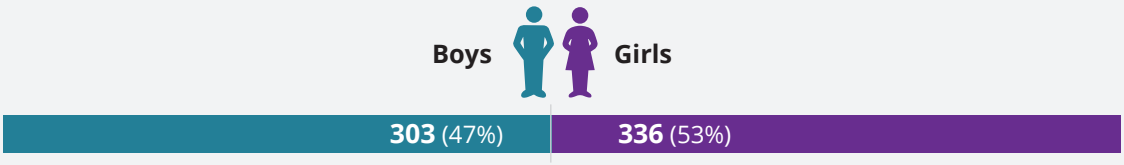
Note: The total number of service recipients in July 2012 to December 2020 combined does not sum to the years because some children and young people received services in multiple calendar years; these services recipients were counted only once in the total.

Source: Table S2.3.

Rates of non-consent to share the information have been very low, and between 2016 and 2020 there were no instances of non-consent.

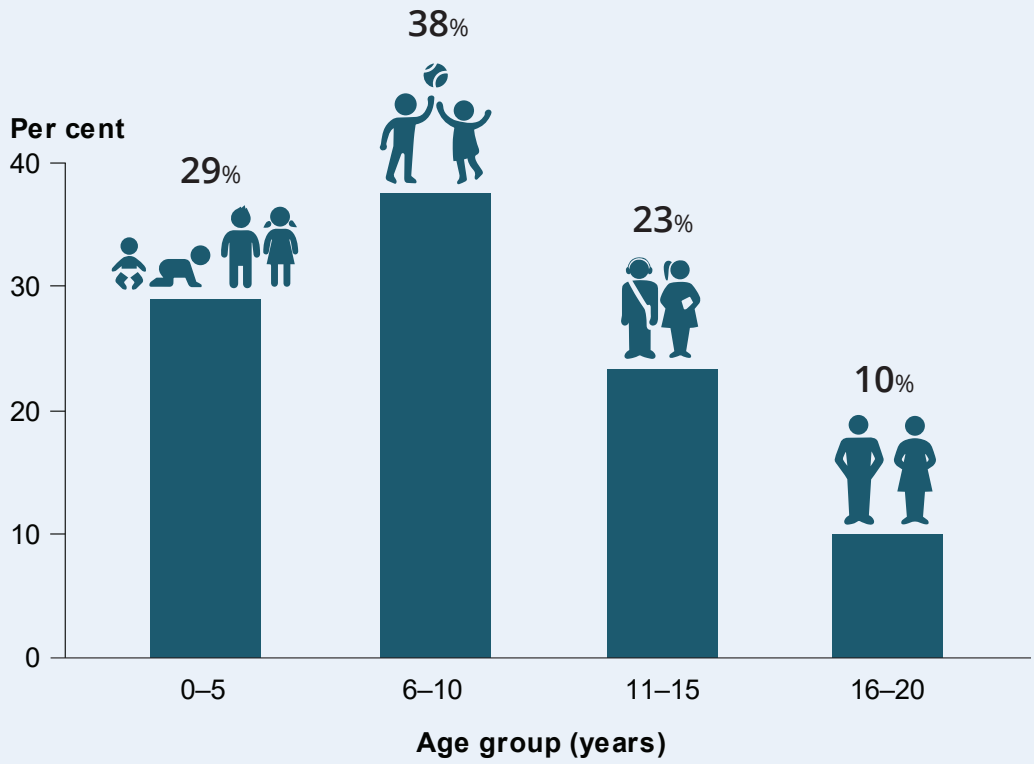
In 2020, the number of service recipients who were girls was slightly higher than the proportion who were boys (336 compared with 303) (Figure 2.6).

Figure 2.6: ENT teleotology service recipients in 2020, by sex



Among service recipients in 2020, the highest proportion (38%) were aged 6–10 (Figure 2.7).

Figure 2.7: ENT teleotology service recipients in 2020, by age group



Source: Table S2.4.

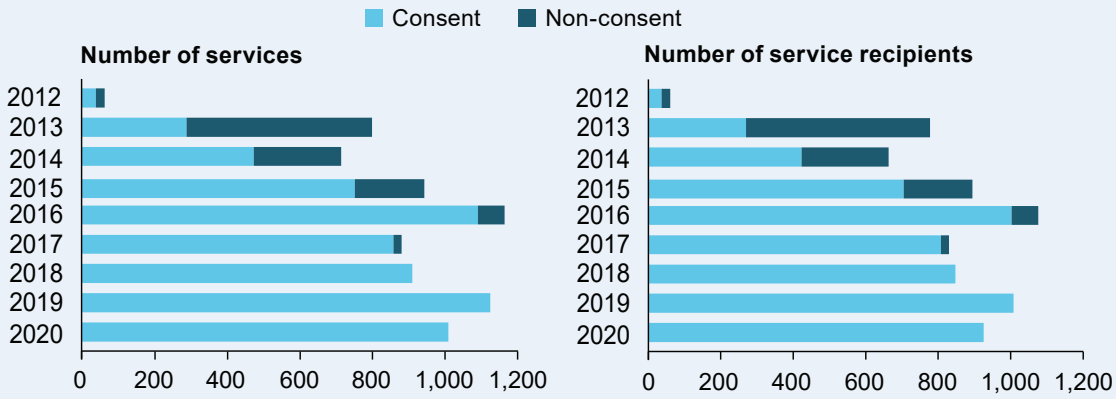
More information on ENT services, such as services recommended by ENT specialists, can be found in the supplementary tables online.

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 2020, 1,004 CNS services were provided to 926 service recipients (Figure 2.8).
- From July 2012 to December 2020, a total of 7,569 services have been provided to a total of 5,015 unique service recipients.
- The numbers of CNS services and service recipients decreased slightly between 2019 and 2020.

Figure 2.8: Number of CNS services and service recipients, July 2012 to December 2020



Notes:

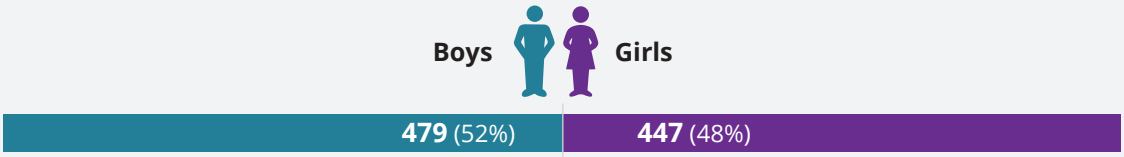
1. The total number of service recipients in July 2012 to December 2020 combined does not sum to the years because some children and young people received services in multiple calendar years; these services recipients were counted only once in the total.
2. Number of CNS services and service recipients 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 in recent years.

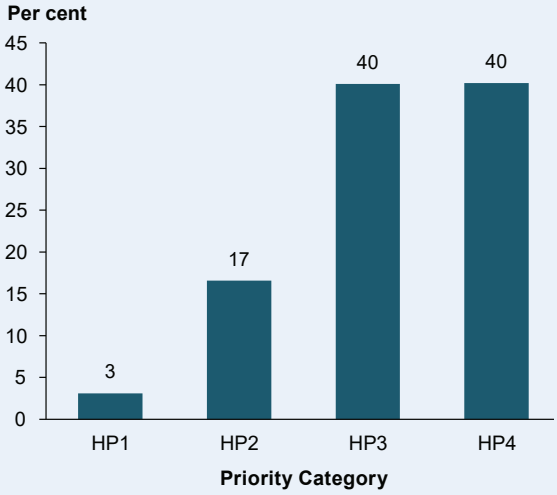
More boys than girls received CNS services in 2020 (479 compared with 447) (Figure 2.9).

Figure 2.9: Clinical Nurse Specialist service recipients in 2020, by sex



The CNS services are available to Aboriginal and Torres Strait Islander 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.

Figure 2.10: Hearing health priority (linked to age) among CNS service recipients, 2020



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 2020: 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.

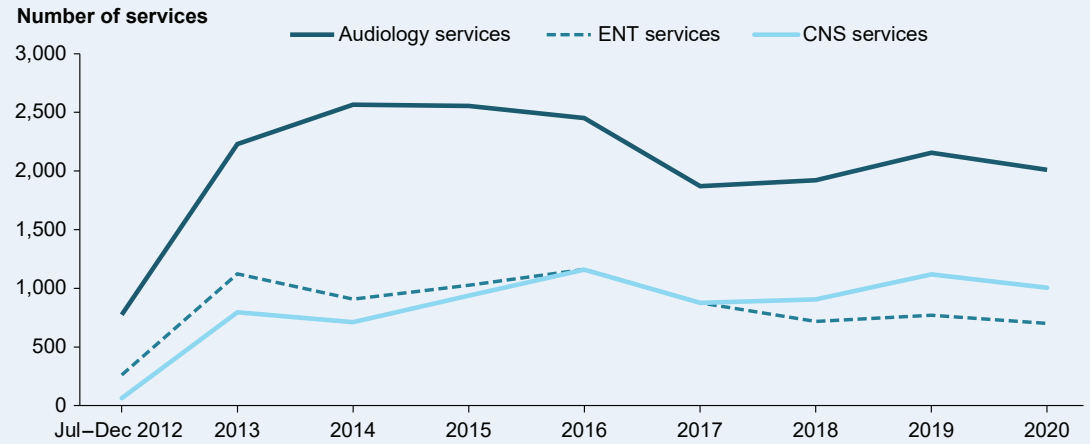
More information on CNS services can be found in the supplementary tables (S2.5 and S2.6).

Impact of COVID-19

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. However, between 2019 and 2020, the number of services decreased across all 3 service types (Figure 2.11).

Figure 2.11: Number of services provided, audiology, ENT and CNS, July 2012 to December 2020



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

In 2020 there was a noticeable drop between February and April across the number of audiology, CNS and ENT teleotology services provided (see Figures 2.12, 2.13 and 2.14). Over February to March 2020 the number of audiology services received among Indigenous children and young people decreased from 284 to 204, and then fell to less than 5 services in April 2020. The timing of this decrease coincides with the implementation of strict measures across Australia to reduce the risk of community transmission of COVID-19, including limiting public gatherings and reducing non-essential travel (Health 2020). Pre-pandemic data from 2019 show a small drop in April, likely associated with Easter, public holidays and school holidays, but not to the same extent as that seen in 2020. July data is reflective of the extensive school holidays implemented in the Northern Territory every year, where services cease for 3 weeks.

Despite these restrictions, services increased once travel to remote communities resumed. By June 2020, the number of services had increased back to 2019 levels (or higher), likely

reflecting the easing of restrictions in the Northern Territory. Between June and December 2020, the monthly variation in number of services was similar to that seen in 2019.

Figure 2.12: Audiology services among Indigenous children and young people, January 2019 to December 2020 (monthly)

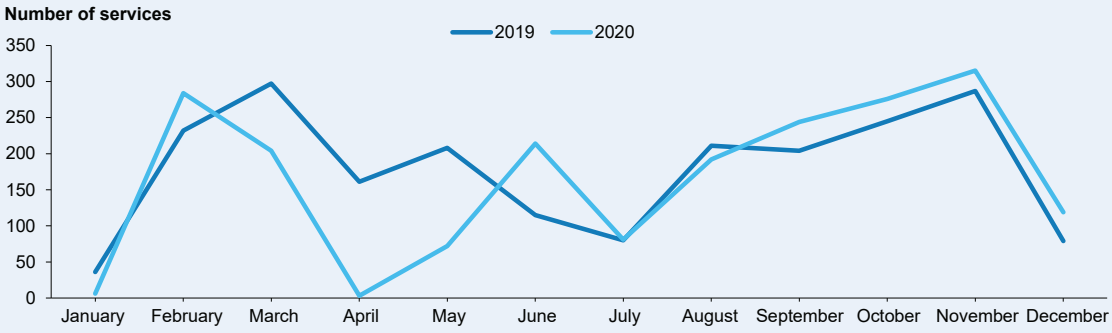


Figure 2.13: CNS services among Indigenous children and young people, January 2019 to December 2020 (monthly)

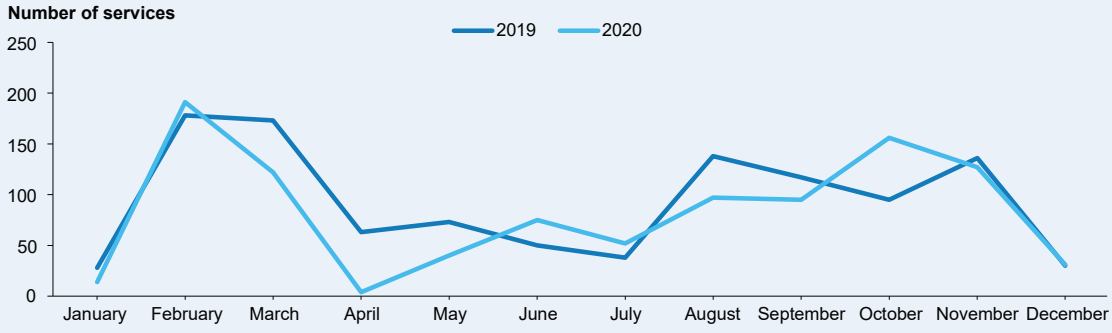
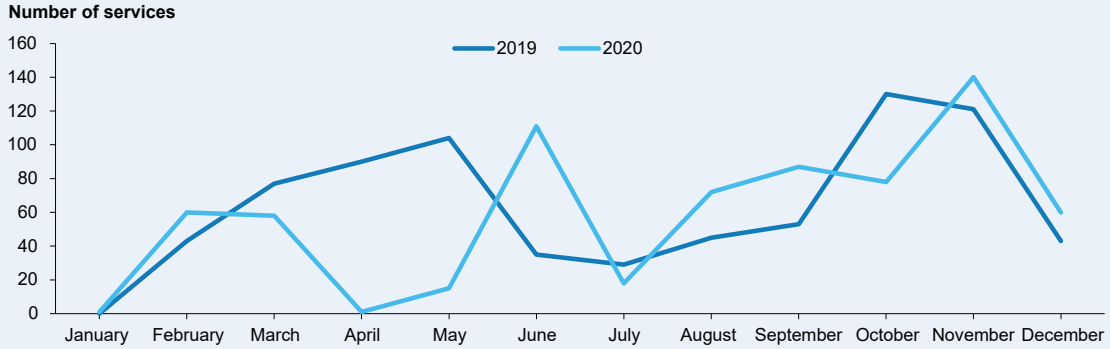
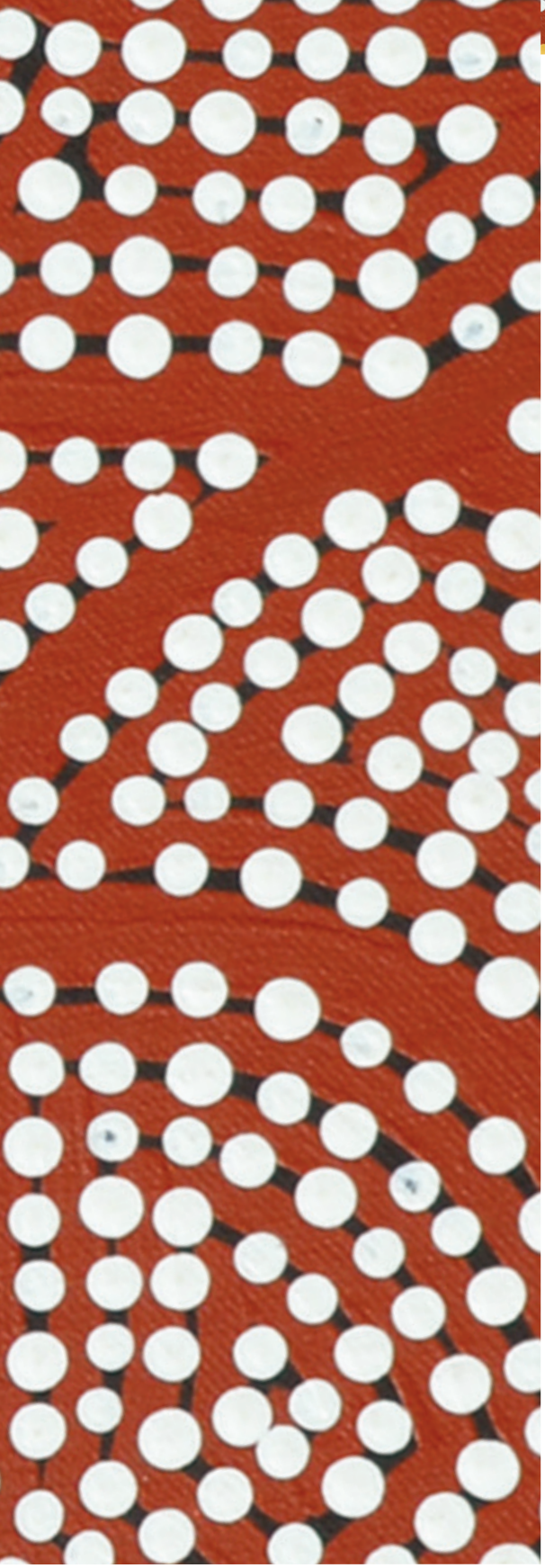


Figure 2.14: ENT services among Indigenous children and young people, January 2019 to December 2020 (monthly)





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:

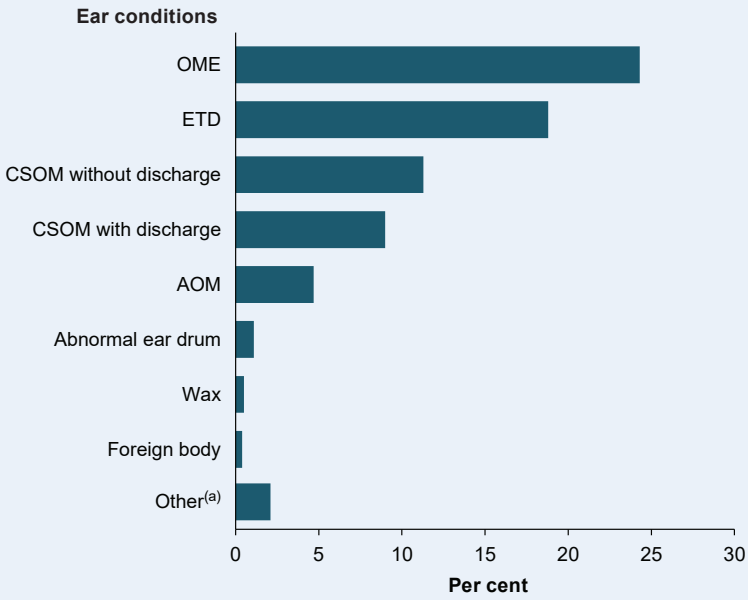
- **acute otitis media (AOM)**—the presence of fluid behind the eardrum plus at least 1 of the following: bulging eardrum, red eardrum, recent discharge of pus, fever, ear pain or irritability for less than 6 weeks
- **chronic suppurative otitis media (CSOM) with discharge**—a persistent suppurative 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 2020, 1,802 Indigenous children and young people received at least 1 audiology, CNS or ENT teleotology service. At their latest service, 1,037 children and young people were diagnosed with at least 1 type of ear condition. The proportion of children who were diagnosed with an ear condition has declined from 66% in 2012 to 58% in 2020, although the proportions of specific ear conditions have had small fluctuations over the years.

In 2020, the most common type of ear condition, among the 1,037 children diagnosed with an ear condition, was otitis media with effusion (OME) (24%, or 437 cases), followed by Eustachian tube dysfunction (ETD) (19%, or 339 cases); chronic suppurative otitis media (CSOM) without discharge (11%, or 204 cases); and chronic suppurative otitis media (CSOM) with discharge (9%, or 162 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 2020



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

(a) 'Other' includes grommets, myringitis, otitis external, tympanosclerosis, and other ear conditions.

Source: Table S3.1.

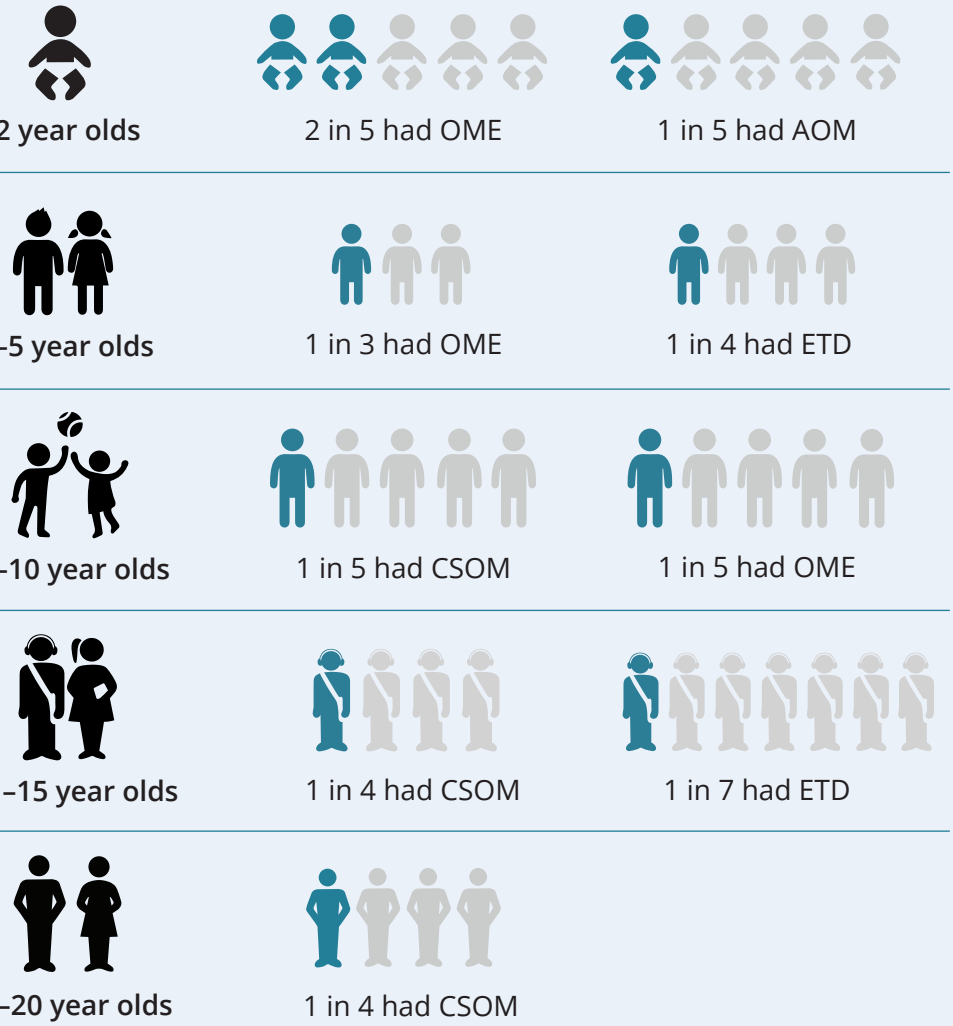
Around 3 in 5 children and young people (58%) were found to have ≥1 ear condition

Age and sex differences

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

Younger children who received a service had the highest proportion of ear conditions. In 2020, 68% of children aged 0–2 and 42% of children aged 16–20 had at least 1 type of ear condition. This pattern reflects the natural profile of ear disease, where children typically grow out of ear conditions (AIHW 2014c).The most common types of ear conditions differed among age groups in 2020, 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 2020, by age group



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

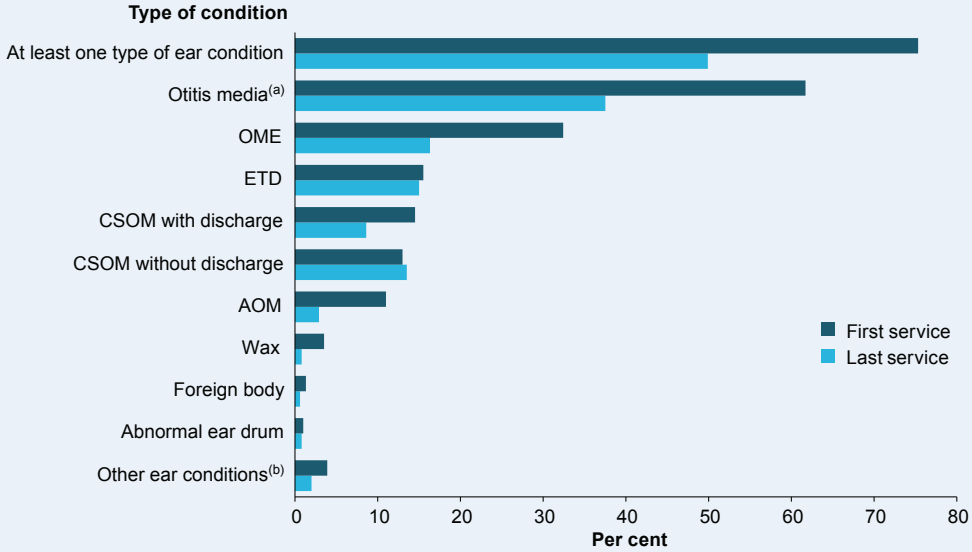
This section presents information about changes in ear conditions, hearing loss and hearing impairment among Indigenous children and young people who received 2 or more audiology services during the hearing health outreach services treatment pathway. This is one way to understand the effectiveness of the hearing health outreach services in terms of improving outcomes. It is important to keep in mind that changes 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 4,478 Indigenous children and young people met this criteria.

For almost all conditions between July 2012 and December 2020, there was an improvement over time. Figure 3.3 shows the change in proportion of ear conditions between first and last services:

- The number of Indigenous children and young people with at least 1 type of ear condition decreased from 3,372 at their first service to 2,235 at their last service.
- The proportion of Indigenous children and young people with at least 1 type of ear condition decreased by 25 percentage points between the first and the last service (from 75% to 50%).
- There was a decrease in the proportion of Indigenous children with an ear condition between first and last services for the majority of middle ear conditions, except for chronic suppurative otitis media without discharge, for which there was a slight increase in the proportion between first and last service.

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 2020



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 1 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

Indigenous 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 2020, there were 926 Indigenous children and young people who received a CNS service and consented to sharing information with the AIHW. Of those, 603 (65%) were diagnosed with at least 1 ear condition at their first CNS visit and 30% were found to have no ear condition (information was missing for the remaining 5%).

The most commonly diagnosed conditions were:

- otitis media with effusion (27%)
- Eustachian tube dysfunction (20%)
- acute otitis media (4.4%).

Among children who received a CNS service, the proportion diagnosed with otitis media with effusion was lower in 2020 than in 2019 (27% compared with 30%), as was the proportion with acute otitis media (4.4% compared with 7.9%). The proportion of CNS service recipients who had Eustachian tube dysfunction was slightly higher in 2020 than 2019 (20% compared with 19%).

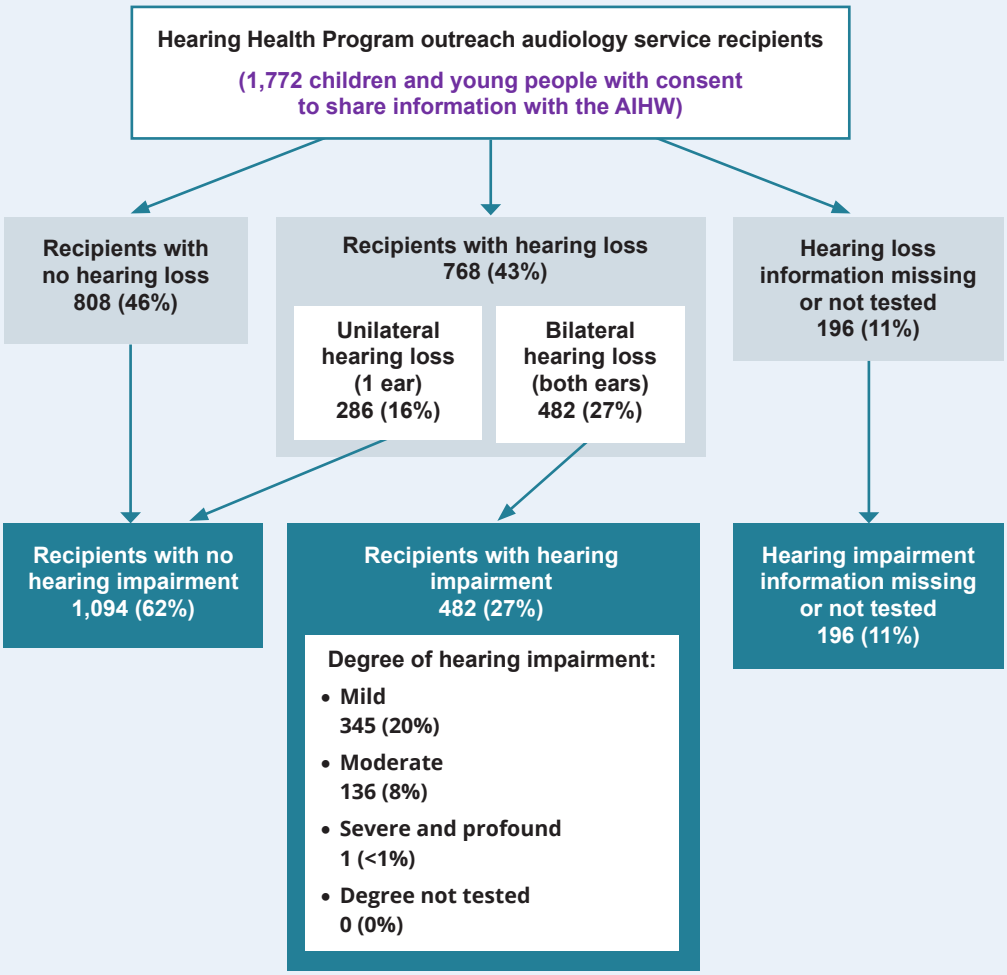
***Find out more** in Table S3.4.*

Hearing status

Two measures of hearing status are used in this report: hearing loss and hearing impairment. 'Hearing loss' may affect 1 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 2020, and the relationship between each.

Figure 3.4: Hearing loss and impairment among Indigenous children and young people who received audiology outreach services (including CNS service recipients), 2020



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 1,772 Indigenous children and young people who received audiology outreach services in 2020, 43% had hearing loss:

- 24% had conductive hearing loss
- 1.3% had sensorineural hearing loss
- 0.9% had mixed hearing loss
- 17% had some form of hearing loss but type could not be determined.

Among the 1,772 Indigenous children and young people who recieved audiology outreach about 1,131 (or 64%) were visited by CNSs in 2020. Among these children, about 50% had some form of hearing loss—34% bilateral and 17% unilateral.

The proportion of children with hearing loss who received both audiology and CNS services, decreased by 29 percentage points between July 2012 and December 2020.

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

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).

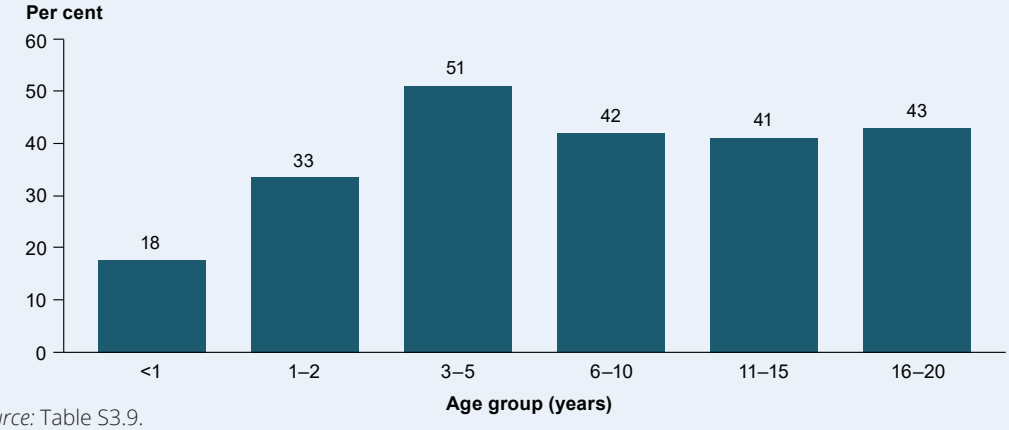
Sensorineural hearing loss: A deviation of hearing threshold from the normal range, attributable to problems in the inner ear or vestibulocochlear nerve.

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

Variation by age and sex

Among Indigenous children and young people who received an audiology service in 2020, the proportion with hearing loss varied by age group (Figure 3.5). Among children aged 3–5, 51% had hearing loss, the highest proportion of any age group.

Figure 3.5: Proportion of children and young people with hearing loss who received audiology services in 2020, by age group



Source: Table S3.9.

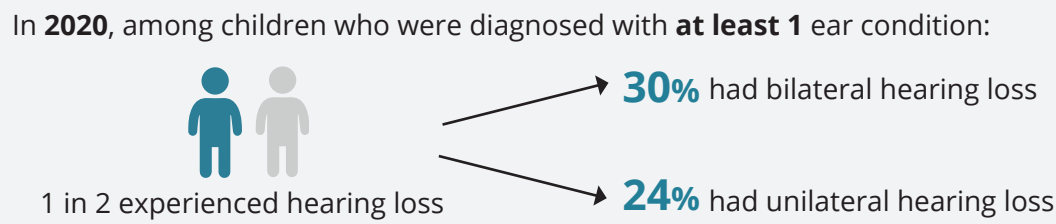
Among the 768 children who received an audiology service in 2020 and had hearing loss, a slightly higher proportion were girls (Figure 3.6).

Figure 3.6: Hearing loss among children and young people in 2020, by sex

Hearing loss among children and young people with ear conditions

Indigenous children and young people who had ear conditions were more likely to have hearing loss than those with no ear conditions (54% compared with 11% in 2020) (see Table S3.10). Among those with at least 1 ear condition, 30% had bilateral hearing loss and a further 24% had unilateral hearing loss (Figure 3.7).

Figure 3.7: Hearing loss among children and young people in 2020 with ear conditions

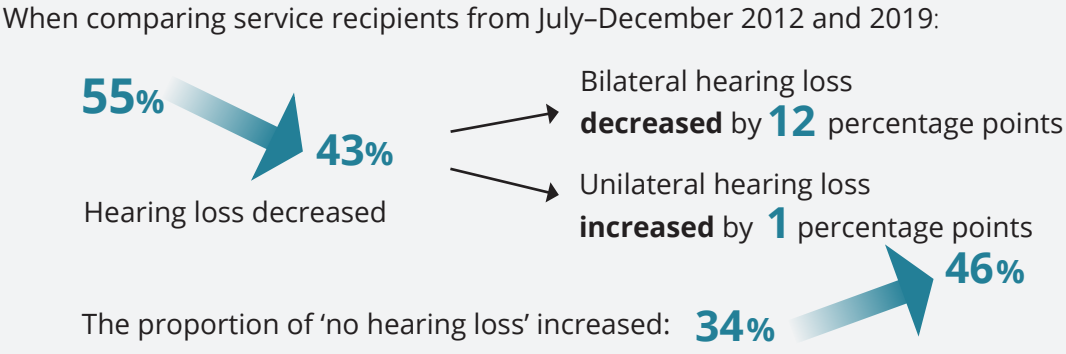


Source: Table S3.10.

Trends

Among Indigenous children and young people who received an audiology service, the proportion with hearing loss decreased from 55% in July–December 2012 to 43% in 2020 (Figure 3.8).

Figure 3.8: Hearing loss among service recipients over time

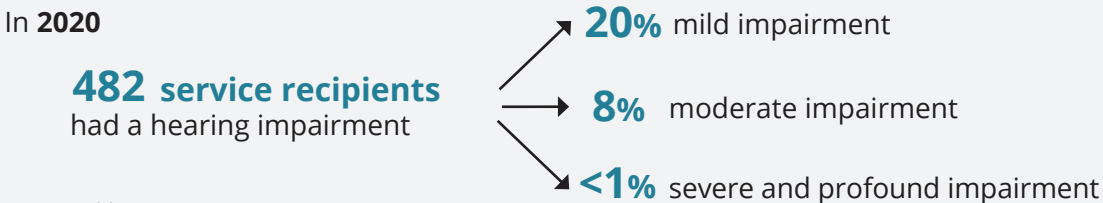


Note: Information on hearing loss status was 'missing' for between 7.4% and 11.8% of service recipients in each year. These recipients were included in the denominator when calculating proportions with hearing loss.
Source: Table S3.5.

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 2020, 482 (27%) 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 2020

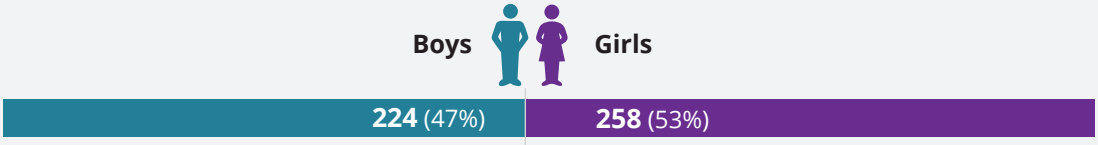


Source: Table S3.7.

Variation by age and sex

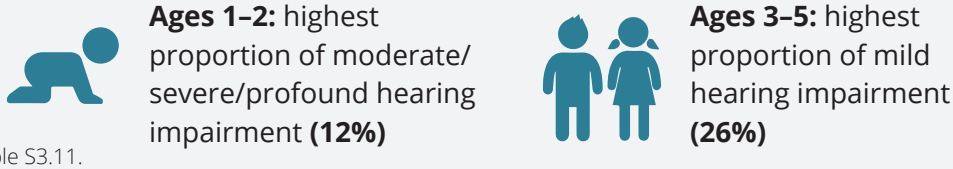
In 2020, among the 482 Indigenous children and young people who received an audiology service and had hearing impairment, a slightly higher proportion were girls (Figure 3.10).

Figure 3.10: Hearing impairment in 2020, by sex



In 2020, the proportion of Indigenous 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 2020 for younger ages



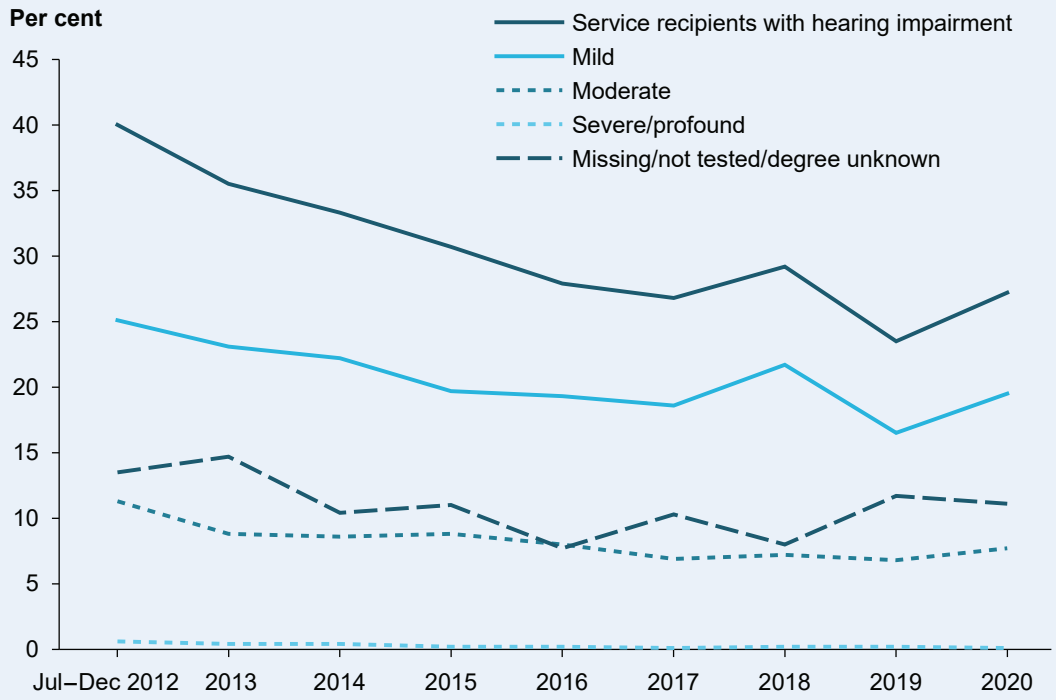
Source: Table S3.11.

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 Indigenous children and young people who received outreach audiology services the proportion with a hearing impairment decreased, from 40% in 2012 to 27% in 2020 (Figure 3.12).

Figure 3.12: Degree of hearing impairment among children and young people, July 2012 to December 2020



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 disease, 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.

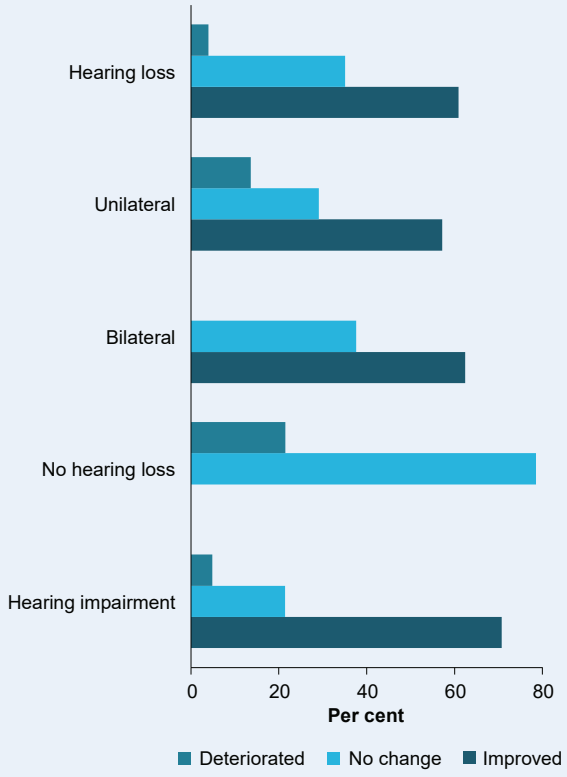
Changes among children who received 2 or more services between 2012 and 2020

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 3,890 Indigenous children and young people who received 2 or more outreach audiology services between July 2012 and December 2020, hearing health generally improved over the period (Figure 3.13):

- 1,712 children (61%) had an improved hearing loss status, with no change in status for 986 (35%) and the status of 113 (4%) had deteriorated.
- Among the 1,800 children with hearing impairment, 1,272 (71%) had improved capability and for 88 (5%) capability had deteriorated.

Figure 3.13: Change in hearing loss and impairment among children who received at least 2 audiology services between July 2012 and December 2020



Sources: 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.

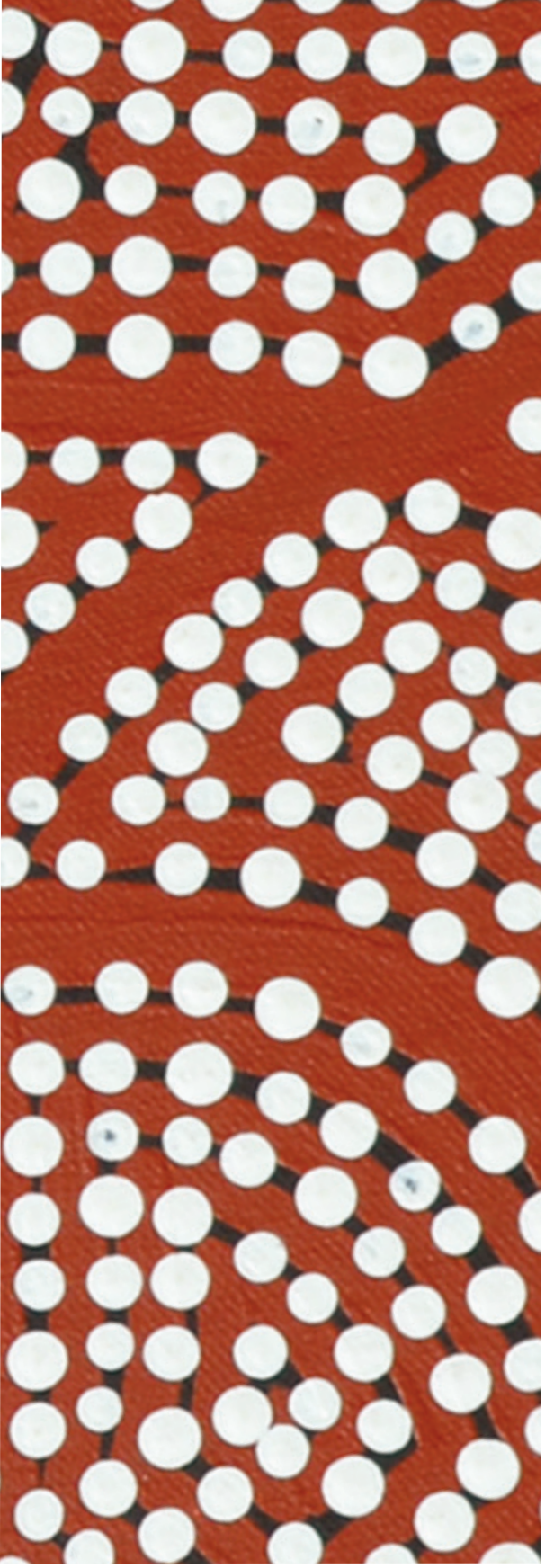
Hearing impairment

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 data consent rates. 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.

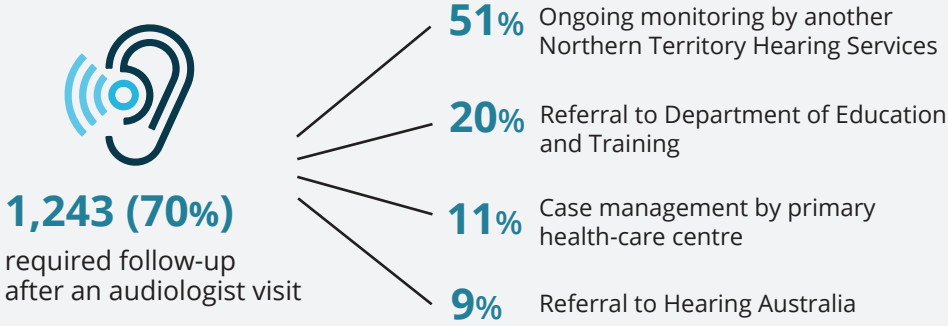
In addition to these hearing health services, children can be referred to other follow-up services. Follow-up can encompass a wide range of services, from having a hearing aid fitted by Hearing Australia, to medical treatment such as ear cleaning or the need for ENT surgery.

Follow-up services required after audiologist visits

In 2020, among 1,772 Indigenous children and young people receiving an audiology service, 70% required at least 1 further action for follow-up. (Percentages in the infographic Figure 4.1 below sum to over 70% because some children required more than 1 referral).

Figure 4.1: Follow-up services required after audiology visits

In 2020, 1,772 children and young people received an audiology service. Among these:



Source: Table S4.1.

Follow-up services required after ENT teleotology services

In 2020, among Indigenous children and young people receiving an ENT teletology service 63% 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.

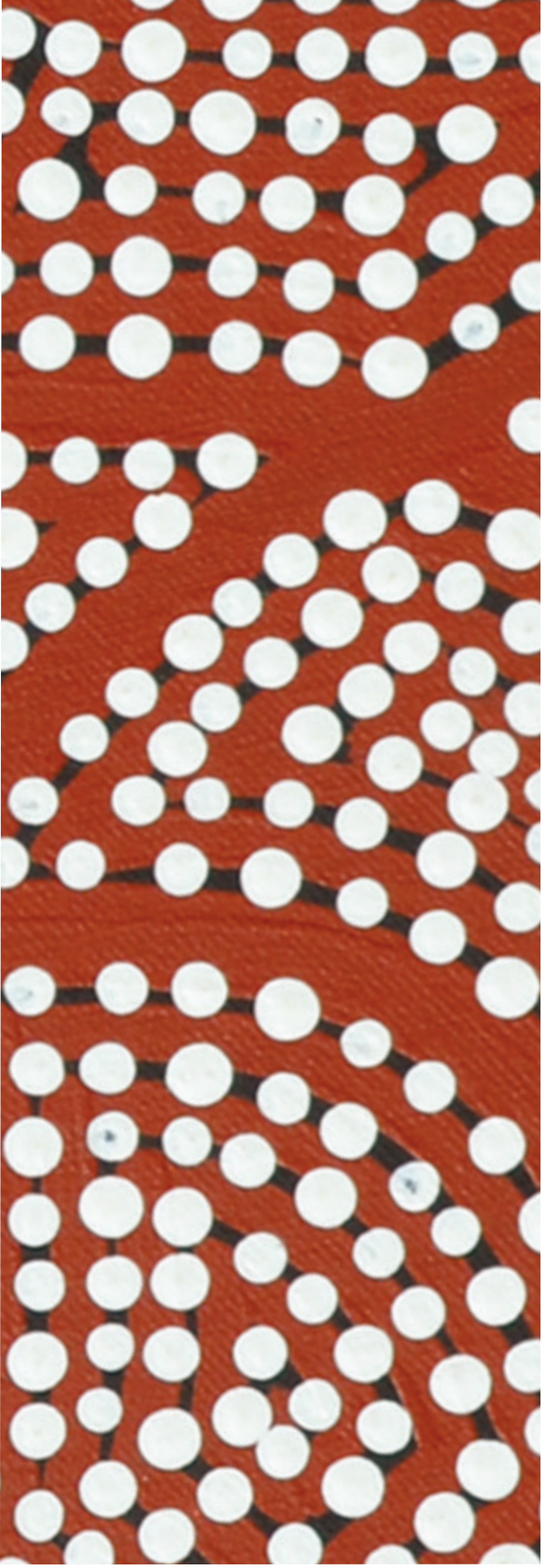
Waiting list for audiology services and ENT teleotology services

Although many hearing health services have been provided, the demand for audiology services and ENT teleotology services remains high among Indigenous 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 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 Indigenous communities 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 2020, there were 3,109 Indigenous children and young people on the audiology waiting list. Of these, 1,407 were new referrals for audiology services and 1,702 were recalls for further audiology follow-up.

In addition, 2,000 Indigenous children and young people were waiting for ENT teleotology services in the Northern Territory. Of these, 770 were new referrals either from Primary Health Care physicians or from the audiology pathway, and required ENT intervention. There were 1,230 children and young people who had been reviewed but required additional follow-up by ENT teleotology services.



5

Regional analysis

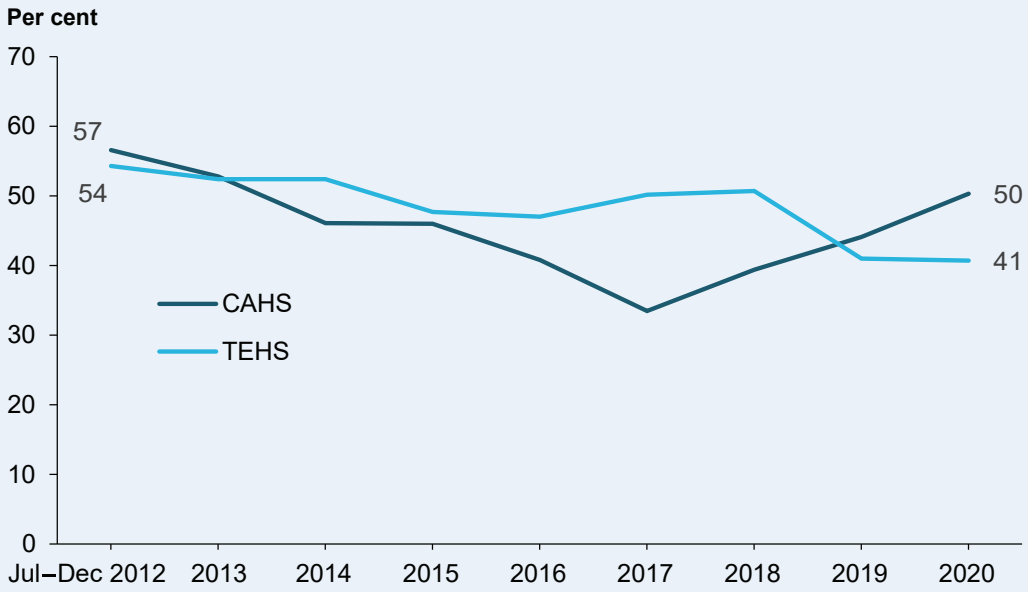
The Northern Territory has 2 main health service delivery regions: the Top End Health Service (TEHS) and the Central Australia Health Service (CAHS). This section presents the hearing health status of the children and young people who received outreach audiology, CNS or ENT teleotology services in these 2 regions. In 2020, 1,287 Indigenous children and young people within the TEHS and 485 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 2019, the gap between the TEHS and the CAHS narrowed, before widening again in 2020 (Figure 5.1). In 2020:

- Indigenous children in the CAHS had a higher proportion of hearing loss (50%, or 244 children) than those in the TEHS (41%, or 524 children).
- The proportion of Indigenous children and young people with no hearing loss was higher in the TEHS (48%, or 614 children) than in the CAHS (40%, or 194 children).

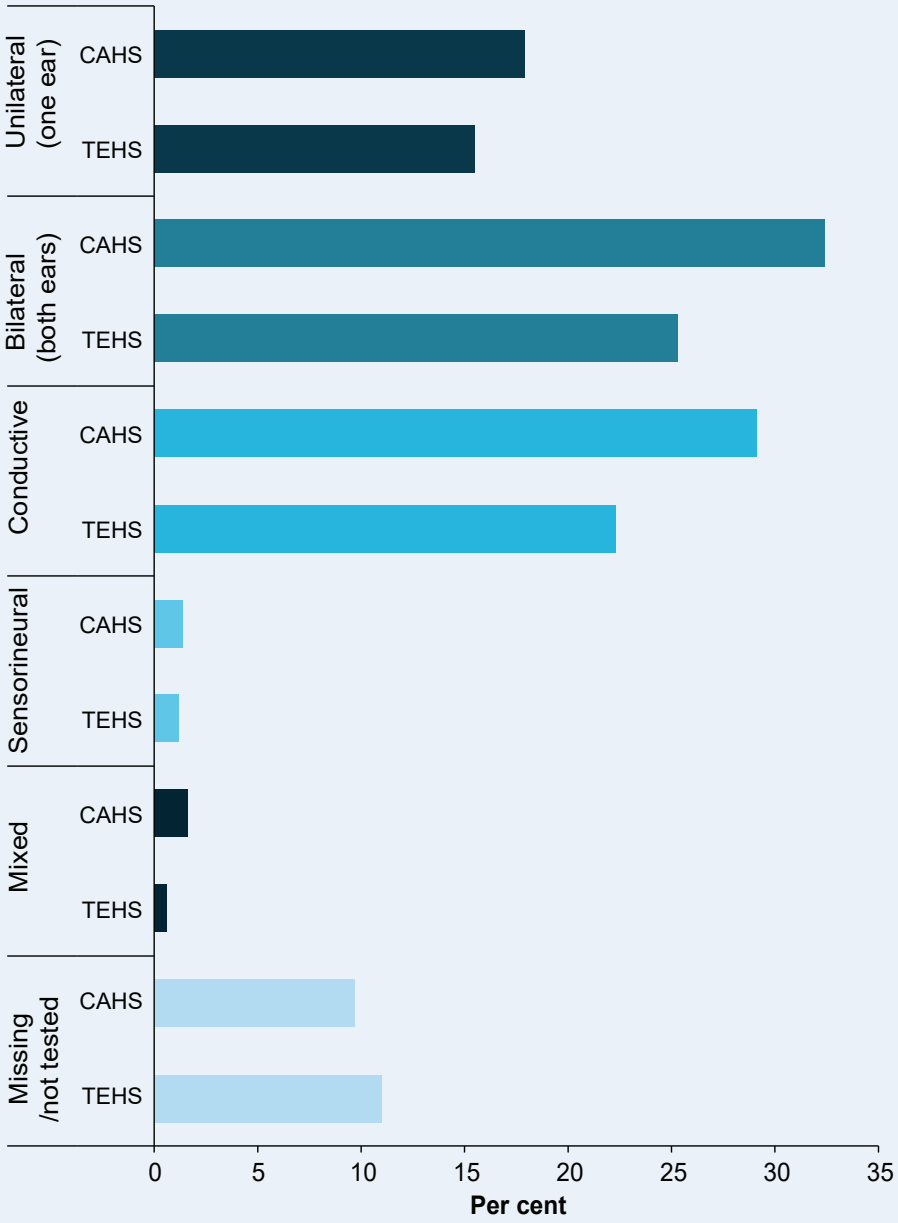
Figure 5.1: Hearing loss among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), July 2012 to December 2020



Source: Table S5.1.

When looking at specific types of hearing loss in 2020 (Figure 5.2), the proportions between children in the TEHS and the CAHS show smaller differences.

Figure 5.2: Types of hearing loss among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), 2020



Sources: Tables S5.1 and S5.2.

Hearing impairment

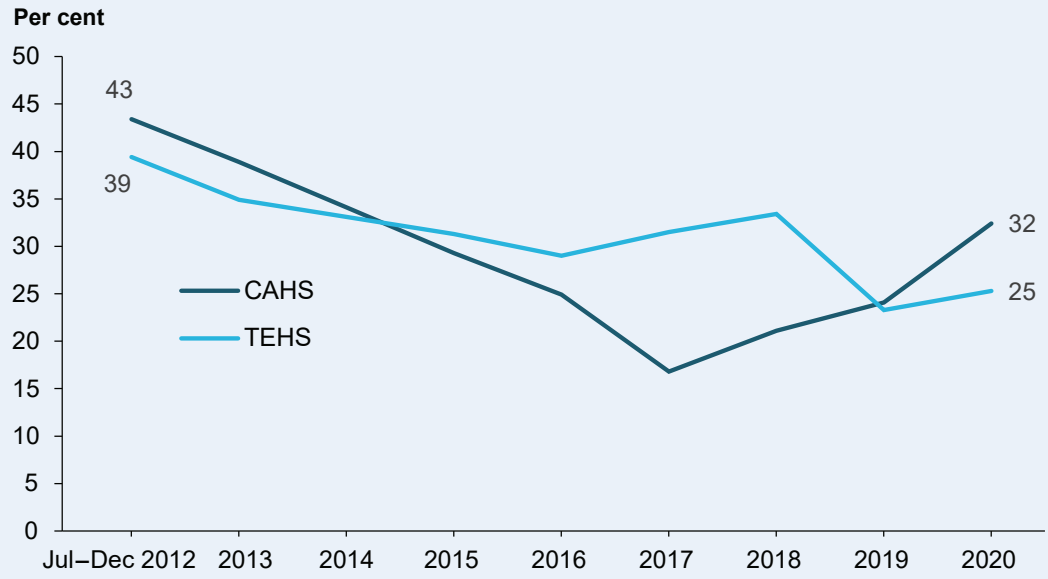
Overall, for both TEHS and CAHS from July 2012 to December 2020:

- the proportion of Indigenous children and young people with hearing impairment decreased over time, (Figure 5.3) by:
  - 14 percentage points for the TEHS
  - 11 percentage points for the CAHS
- the proportion of Indigenous children and young people with no hearing impairment increased over the years by:
  - 15 percentage points for the TEHS
  - 3 percentage points for the CAHS.

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

The gap between the TEHS and CAHS then narrowed in 2019, when children and young people in the TEHS and CAHS had similar proportions of hearing impairment (both about 24%), before again widening in 2020. In 2020, 32% of Indigenous children and young people receiving audiology services in CAHS had hearing impairment, compared with 25% of those in TEHS.

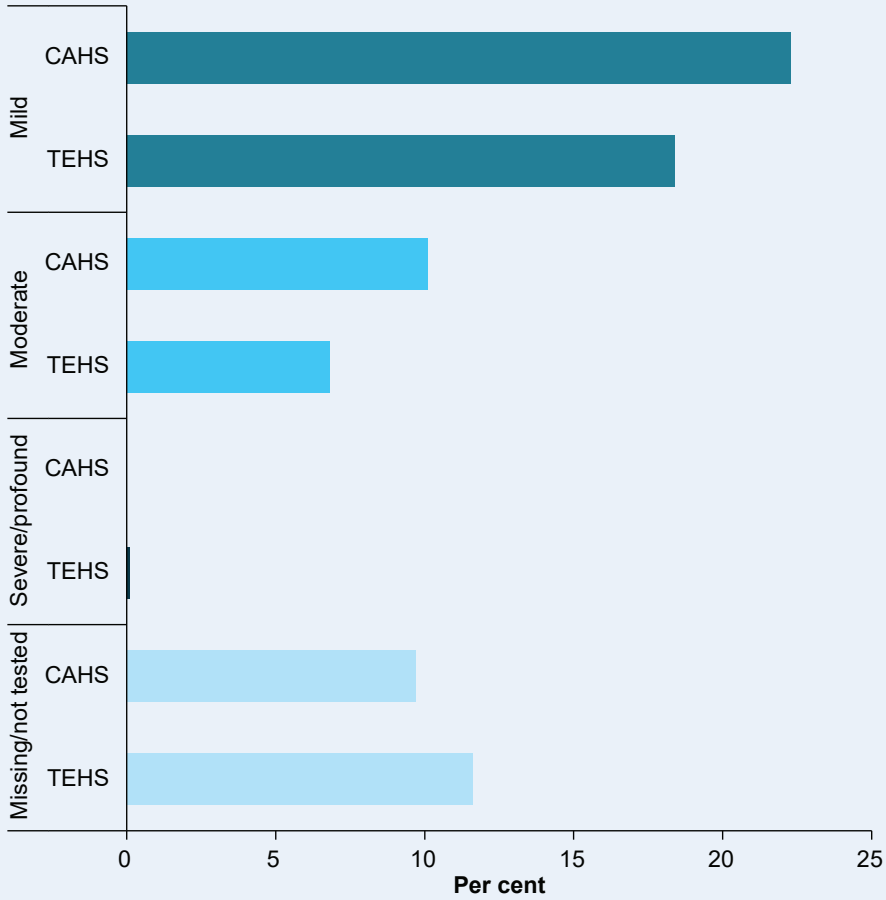
Figure 5.3: Hearing impairment among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), July 2012 to December 2020



Source: Table S5.3.

Proportions of children and young people with mild hearing impairment were higher in the CAHS than in the TEHS (22% compared with 18%) (Figure 5.4). The proportions of children with moderate hearing impairment were also slightly higher in the CAHS than in the TEHS (10% compared with 7%).

Figure 5.4: Types of hearing impairment among children and young people who received outreach audiology services in Central Australia (CAHS) and the Top End (TEHS), 2020

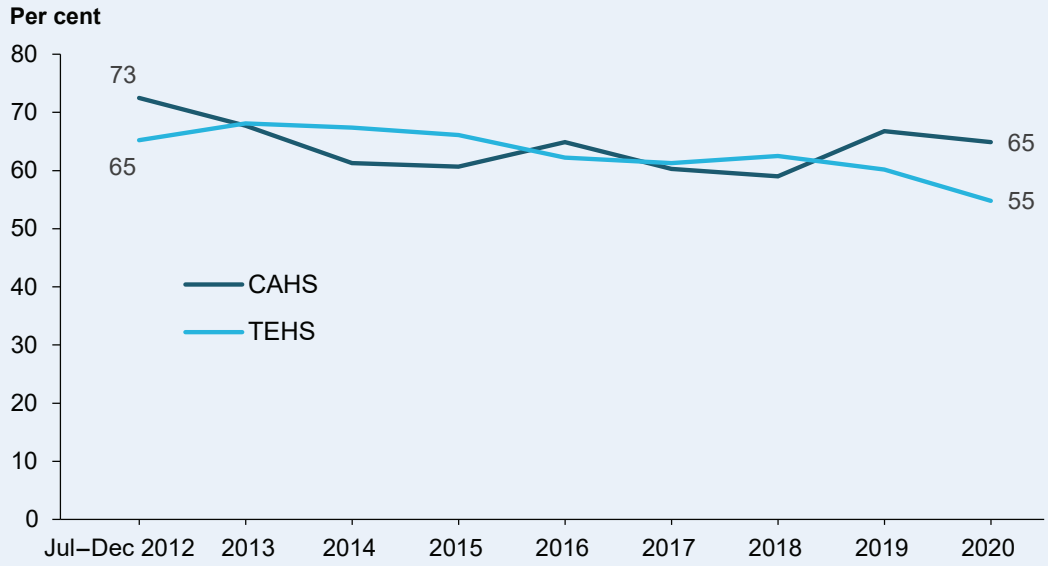


Source: Table S5.3.

Ear conditions

Between July 2012 and December 2020, the proportion of Indigenous 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 55% in the TEHS and from 73% to 65% 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)

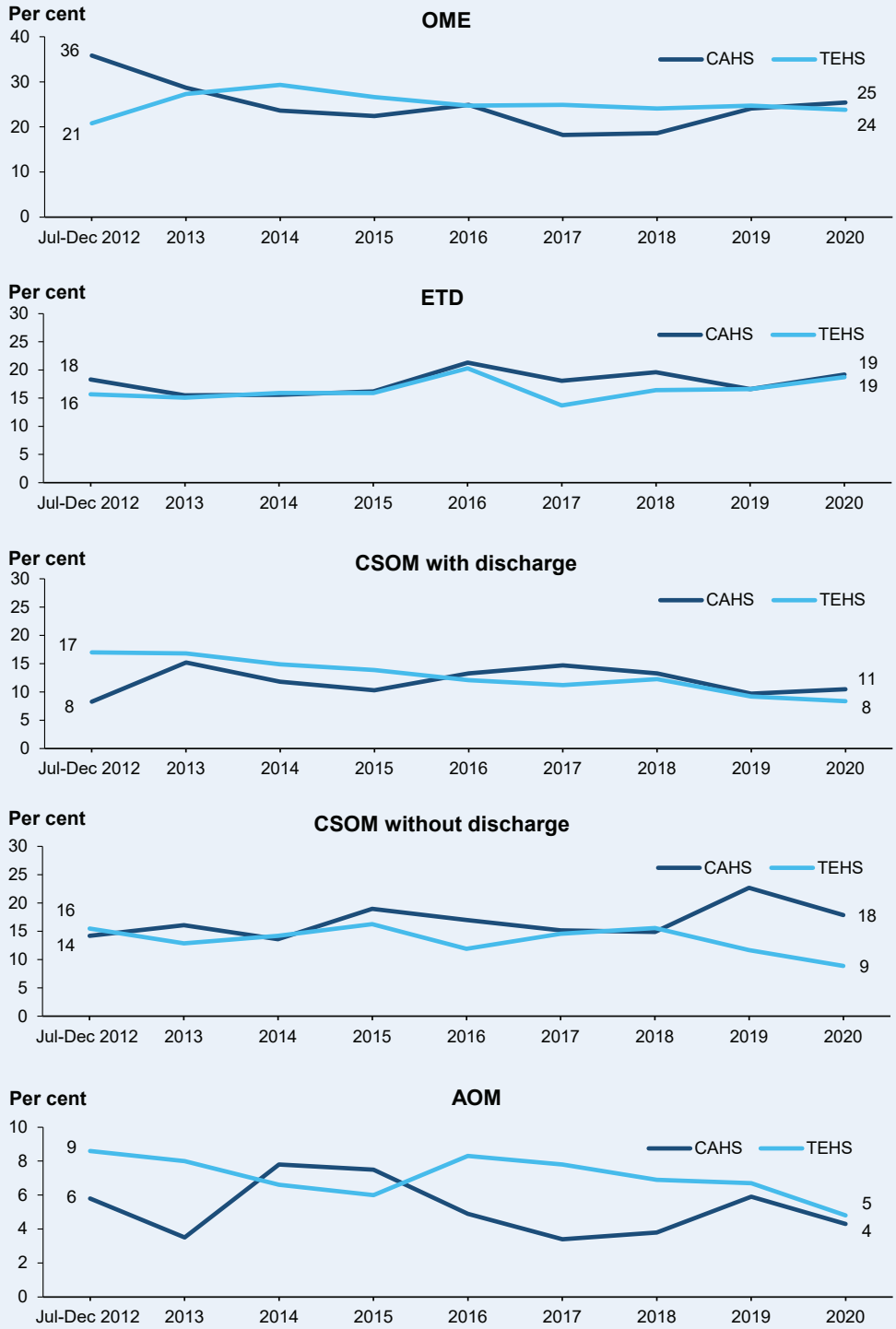


Source: Table S5.4.

The distribution of types of ear condition varied over time in both regions (Figure 5.6). For example, from July 2012 to December 2020:

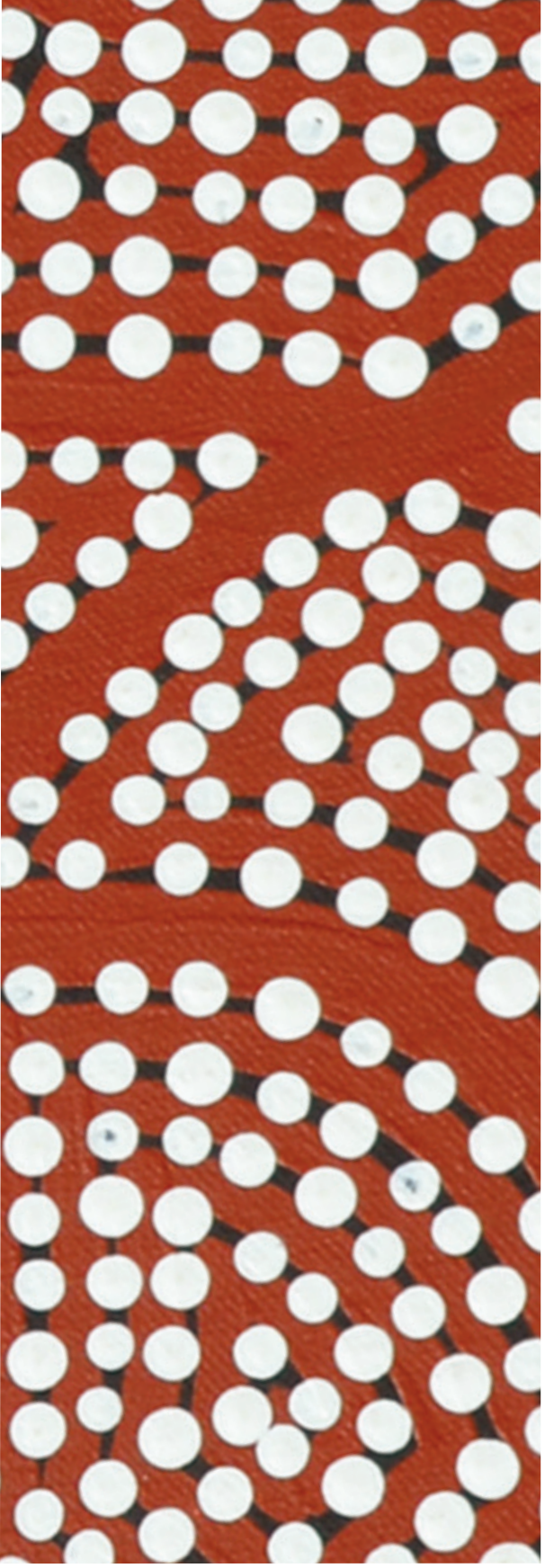
- the proportion of Indigenous children with otitis media with effusion increased in the TEHS between 2012 and 2014 (from 21% to 29%), before decreasing and then remaining relatively steady at around 24% to 25% since 2016. In the CAHS, the proportion decreased between 2012 and 2013 (from 36% to 29%), and ranged between 18% (in 2017) and 25% (in 2020) in the subsequent years.
- the proportion of Indigenous children with chronic suppurative otitis media with discharge decreased in the TEHS, from 17% to 8%. In the CAHS, from 2012 to 2019, the proportion fluctuated between 8% and 15%, and was 11% in 2020.
- in both TEHS and CAHS, the proportion of Indigenous children with Eustachian tube dysfunction was highest in 2016 (21% for CAHS and 20% for TEHS). Across the other years, it ranged between 16% and 20% for CAHS, and between 14% and 19% for TEHS.

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



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).

Some targets are annual, and others are set for a longer period. Most of the targets for 2020 were met or exceeded. Some targets are designed to be met within 3 years. Complete data for those targets are not yet available, and can only be assessed as to whether or not they are on track to be met at this point in time.

Service delivery

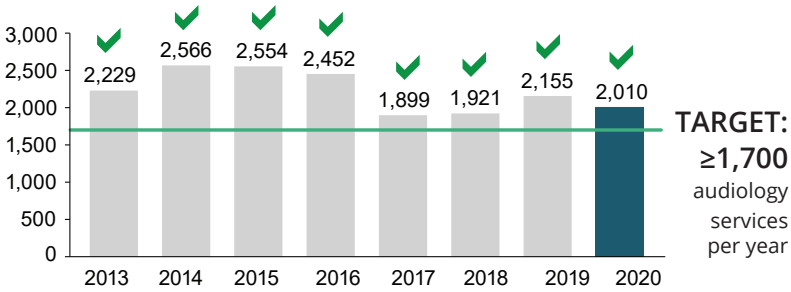
Service delivery benchmarks for hearing health service delivery are set for audiology, CNS and health promotion and training activities. These are measured by the number of services per year. From 2013 to 2020, targets for these services were either met or exceeded. Note that the Northern Territory Health 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, 2013–2020



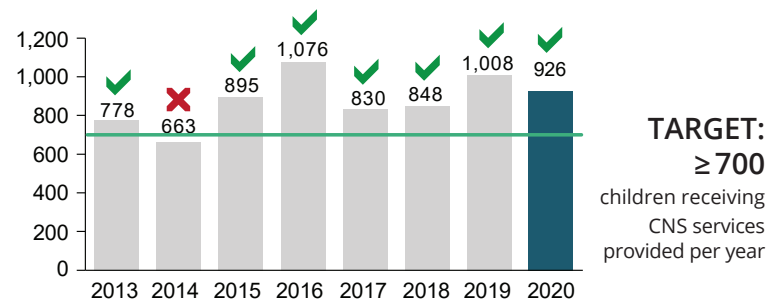
Note: Data on audiology services provided to children and young people in some years between 2013 and 2019 may differ slightly from previous reports as a result of revisions and improvements to data quality.

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, 2013–2020

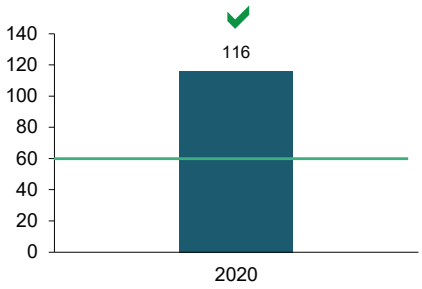


Health promotion services and activities

Indicator:
Health promotion

Delivery of hearing health promotion or training services and activities

Figure 6.3: Number of services/activities provided in 2020



TARGET:
60
preventative hearing health promotion or training services/activities in 2020

Health outcomes

Health outcomes in this program are measured every 3 years (July 2012–June 2015, July 2015–December 2018 and January 2019–December 2021). At the beginning of each period, the benchmarks for health outcomes were raised. All benchmarks in the first 2 periods have been met.

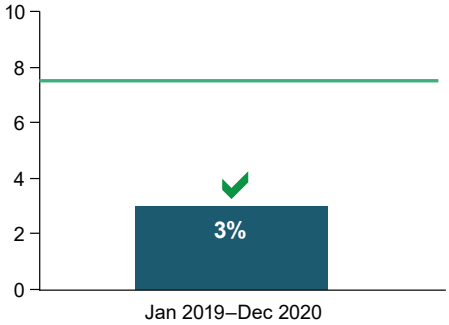
For the third period, data are available for 2 of the 3 years (2019 and 2020). Though not yet possible to assess if the health outcomes targets have been met, data for the two-year period suggests this hearing impairment target is on track to be met. Of the 4 targets related to middle ear conditions, progress towards one target—children aged 6–15 with chronic suppurative otitis media—is on track, though by a small margin (0.2 percentage points).

Hearing impairment

Indicator:
Hearing impairment

Proportion of children tested between January 2019 and December 2020 with moderate or severe conductive **hearing impairment**

Figure 6.4: Proportion of children with moderate/severe conductive hearing impairment, January 2019 to December 2020



TARGET:
≤7.5%
of children tested with moderate/severe conductive hearing impairment

Middle ear conditions

Indicator: Children with CSOM

Proportion of children who received an audiology check or CNS service between January 2019 and December 2020 who were found to have **CSOM**

Figure 6.5a: Proportion of children (aged 0–5) with CSOM, January 2019 to December 2020

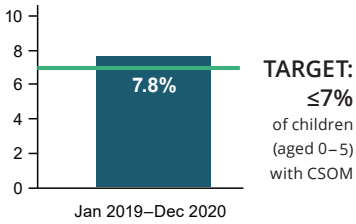
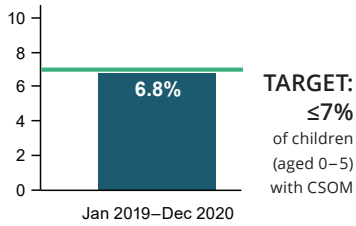


Figure 6.5b: Proportion of children (aged 6–15) with CSOM, January 2019 to December 2020



Indicator: Children with dry perforation

Proportion of children who received an audiology check or CNS service between January 2019 and December 2020 who were found to have **dry perforation**

Figure 6.6a: Proportion of children (aged 0–5) with dry perforation, January 2019 to December 2020

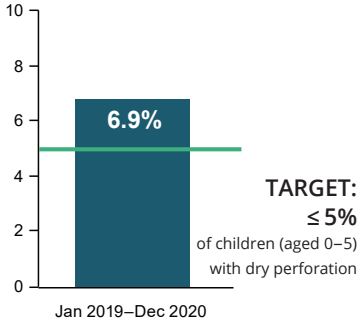
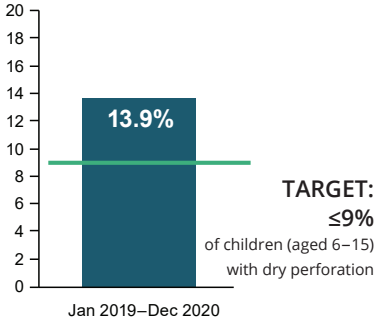


Figure 6.6b: Proportion of children (aged 6–15) with dry perforation, January 2019 to December 2020



Appendix A: About the Hearing Health Program data collections

Data collection, management and reporting

The AIHW was commissioned by the Department of Health 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 1 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 Aboriginal and Torres Strait Islander children and young people in the Northern Territory. The outreach audiology and ear, nose and throat (ENT) teleotology services are available to all Indigenous children and young people, but not all of them access these services. The Clinical Nurse Specialist (CNS) program is available only to Indigenous 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 Indigenous children and young people in the Northern Territory.

Due to differences in the scope of the programs covered in previous AIHW hearing health reports, analyses from individual reports should not be compared with analyses in subsequent annual reports.

Outreach audiology data collection summary

- This data collection included about 8,600 children and young people, aged under 21, who received Northern Territory outreach audiology services between July 2012 and December 2020. This accounted for about 26% of the Northern Territory's Indigenous population of this age group (but was not a random sample).
- Hearing loss status was missing for about 11% of service participants who completed audiology assessments in 2020, 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/index.phtml/itemId/747606.

ENT teleotology data collection summary

- This data collection included over 3,900 children and young people who were aged under 21 and received ENT teleotology services between July 2012 and December 2020. This accounted for about 13% of the Northern Territory Indigenous 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/index.phtml/itemId/747608.

CNS data collection summary

- The data collection includes over 5,000 children aged under 21 who received CNS services between July 2012 to December 2020. This accounted for about 17% of the Northern Territory's Indigenous 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/index.phtml/itemId/747610.

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 Indigenous 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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The Department of Health provided funds to support data collection and report production, and members of the Indigenous Health Division are gratefully acknowledged for their comments on this report.

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).

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

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).

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 foreward data collection service delivery model.

unilateral hearing loss: Hearing loss in 1 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.
- AIHW 2012. Northern Territory Emergency Response Child Health Check Initiative: follow-up services for oral and ear health, final report, August 2007–June 2012. Cat. no. DEN 223. Canberra: AIHW.
- AIHW 2014. Stronger Futures in the Northern Territory: hearing health services 2012–2013. Cat. no. IHW 117. Canberra: AIHW.
- 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.
- AIHW 2015. Hearing health outreach services to Indigenous children and young people in the Northern Territory: 2012–13 and 2013–14. Cat. no. IHW 149. Canberra: AIHW.
- AIHW 2017. Northern Territory Outreach Hearing Health Program: July 2012 to December 2016. Cat. no. IHW 189. Canberra: AIHW.
- AIHW 2017. Northern Territory Remote Aboriginal Investment: Ear and Hearing Health Program—July 2012 to June 2016. Cat. no. IHW 176. Canberra: AIHW.
- 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. Cat. no. IHW 228. 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 presents information on hearing health outreach services provided to Aboriginal and Torres Strait Islander children and young people in the Northern Territory. It shows that in 2020 there were: 2,010 audiology services; 701 ear, nose and throat teleotology services; and 1,004 Clinical Nurse Specialist visits. Among children and young people who received at least 2 services between 2012 and 2020, 61% had improved hearing loss and 71% had improved hearing impairment.

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