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Hearing health outreach services to Aboriginal and Torres Strait Islander children and young people in the Northern Territory

2012–13 to 2014–15

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*Authoritative information and statistics
to promote better health and wellbeing*

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Australian Institute of Health and Welfare
Canberra

Cat. no. IHW 163

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Digital and Media Communications Unit
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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Contents

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Abbreviations

AIHW	Australian Institute of Health and Welfare
AOM	acute otitis media
CHCI(CtG)	Child Health Check Initiative/Closing the Gap
CHHC	Child Hearing Health Coordinator
CNC	clinical nurse consultant
CSOM	chronic suppurative otitis media
dB HL	decibel hearing level
ENT	ear, nose and throat
ETD	eustachian tube dysfunction
HEBHBL	Healthy Ears—Better Hearing, Better Listening
HRN	hospital registration number
Hz	Hertz
NT	Northern Territory
NT DoH	Northern Territory Department of Health
OME	otitis media with effusion
SFNT	National Partnership Agreement on Stronger Futures in the Northern Territory
VROA	visual reinforced orientation audiometry

Symbols

—	nil or rounded to zero
. .	not applicable
<=	less than or equal to
<	less than
>=	greater than or equal to

Summary

This report presents information on ear and hearing health outreach services funded by the Australian Government Department of Health and delivered by the Northern Territory Department of Health between July 2012 and June 2015 to Aboriginal and Torres Strait Islander children and young people in the Northern Territory.

Service delivery

- In 2014–15:
  - 2,904 outreach audiology services were provided to 2,421 children and young people
  - 937 ear, nose and throat (ENT) teleotology services were provided to 860 children and young people
  - Child Hearing Health Coordinators (CHHCs) conducted 569 visits to 550 children.
- From July 2012 to June 2015:
  - 6,964 outreach audiology services were provided to 4,427 children and young people
  - 2,737 ENT teleotology services were provided to 1,872 children and young people
  - 1,604 children were seen at 1,777 CHHC visits.

Hearing health status

- In 2014–15, 46% of audiology service recipients had hearing loss at their latest service, and 29% had a hearing impairment.
- Of the 1,237 children and young people who received 2 or more audiology services from July 2012 to June 2015, a total of 984 (80%) had hearing loss at their first audiology service. Of these, 44% experienced functional improvements in their hearing by their last service (33% gained normal hearing capability at their last check, and 11% improved from bilateral to unilateral hearing loss).
- Among the 626 children and young people with a hearing impairment at their first audiology check, the severity of impairment improved for 56% at their last check, remained at the same level for 37%, and deteriorated for 6%.

Ear conditions

- In 2014–15, of the 2,410 children and young people who received an audiology or ENT service, 64% were diagnosed with at least 1 type of ear condition (a slight increase from 61% in 2013–14)—most commonly otitis media with effusion (OME) (24%).
- There were 1,505 children and young people who received 2 or more ENT or audiology services from July 2012 to June 2015. Of these, the proportion diagnosed with at least 1 ear condition decreased from 78% at the first service to 72% at the last service.
- Among the 1,820 children and young people who received 3 or more audiology or ENT services between August 2007 (when hearing health services funded by the Northern Territory Emergency Response Child Health Check Initiative started) and June 2015, the proportion diagnosed with at least 1 ear condition decreased from 79% at the first service to 52% at the last service—an overall decrease of 27 percentage points.
- Among audiology and ENT service recipients diagnosed with chronic suppurative otitis media (CSOM) with discharge or CSOM without discharge at an initial service, there were some improvements—the proportion with no ear conditions at their latest service was 23% of those initially diagnosed with CSOM with discharge, and 33% of those initially diagnosed with CSOM without discharge.

1 Introduction

This report presents information on ear and hearing health outreach services provided to Aboriginal and Torres Strait Islander children and young people in the Northern Territory, on their hearing health, and on the ear conditions that they experience. It is the third annual report in its series. Services include those provided by audiologists; ear, nose and throat (ENT) specialists; and Child Hearing Health Coordinators (CHHCs). They are funded by the Australian Government, through the National Partnership Agreement on Stronger Futures in the Northern Territory (SFNT) (for children and young people aged under 16) and the Healthy Ears—Better Hearing, Better Listening programme (for children and young people aged 21 and under).

The report focuses on services delivered and changes in ear and hearing health among service recipients from July 2012 to June 2015. Hearing health services provided through the SFNT replaced and expanded upon services implemented under the Northern Territory Emergency Response Child Health Check Initiative and the Closing the Gap in the Northern Territory National Partnership Agreement (CHCI(CtG)); therefore, the report also includes some analyses over a longer period (August 2007 to June 2015) for children and young people who received multiple audiology or ENT services. This allows an examination of the effect of hearing health services on children and young people's ear and hearing health over the whole life course of associated programs delivered in the Northern Territory.

The report provides information to answer the following questions:

- How many hearing health services were delivered, and to how many children and young people? Were there differences by demographic variables such as age and sex?
- What was the hearing health status (hearing loss and degree of hearing impairment) among children and young people who received audiology services?
- What was the prevalence of ear conditions among children and young people who received audiology and ENT teleotology services?
- Is there evidence to suggest the hearing health programs in the Northern Territory are effective in improving the ear and hearing health of the children and young people who received services?
- Were performance benchmarks for the SFNT hearing health program reached in 2014–15?

1.1 Background

The evidence suggests that Indigenous children and young people, particularly in the Northern Territory, suffer extensively from ear and hearing problems. Based on results from the National Aboriginal and Torres Strait Islander Social Survey in 2008, it was estimated that 12% of Indigenous children and young people aged 0–14 had an ear or hearing problem, including 4% with total or partial hearing loss, 3% with otitis media and 5% with other ear or hearing problems. The prevalence of these ear and hearing problems were highest in the Northern Territory compared with other states and territories, and higher than the national average (Table 1.1). However, it should be noted that these survey data are self-reported (by adults, on behalf of children), and therefore may not represent the true prevalence of ear or hearing problems in the population—for example, children with undiagnosed conditions would not be reported.

Table 1.1: Proportion of Indigenous children and young people (aged 0–14) reporting ear or hearing problems, by state and territory, 2008

	NSW	Vic	Qld	WA	SA	Tas/ACT	NT	Australia
Type of ear/hearing problem								
Has ear or hearing problems(a)	*9.6*	*5.6*	*6.9*	*9.0*	*7.8*	*7.8*	*12.1*	*8.6*
Total or partial hearing loss	2.6	1.2(a)	3.0(a)	2.3(a)	2.7(a)	2.8(a)	3.9	2.8
Runny ears or glue ear (otitis media)	4.2	1.7(a)	1.9(a)	4.7	2.0(a)	2.4(a)	2.7(a)	3.1
Other	2.7	2.6(a)	2.3(a)	1.6(a)	2.8(a)	2.6(a)	4.5	2.7
Does not have ear/hearing problems	90.4	94.4	93.1	91.0	92.2	92.2	87.9	91.4
Total(c)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total number	**57,708**	**12,186**	**55,688**	**25,395**	**10,246**	**8,343**	**21,977**	**191,543**
Not known	1.0(a)	1.3(a)	1.0(a)	0.7(a)	0.5(b)	0.1(b)	0.5(b)	0.9

(a) Estimate has a relative standard error of between 25% and 50% and should be used with caution.

(b) Estimate has a relative standard error of greater than 50% and is considered too unreliable for general use.

(c) Excludes not known responses.

Source: AIHW analyses of the 2008 National Aboriginal and Torres Strait Islander Social Survey.

A cross-sectional survey conducted by Morris and colleagues in 2001 found high rates of middle ear conditions among Aboriginal children living remotely in Northern and Central Australia. Of the 709 Aboriginal children aged 6–30 months who were assessed, otitis media affected nearly all children (91%). Overall prevalence estimates were 31% for bilateral otitis media with effusion (OME); 26% for acute otitis media (AOM) without perforation; 15% for chronic suppurative otitis media (CSOM) with discharge; 10% for unilateral OME; 7% for AOM with perforation; and 2% for CSOM without discharge (Morris et al. 2005).

A study by Bailie and colleagues (2008) analysed data from child health services provided by 11 Indigenous primary health care centres throughout Australia, including 4 remote communities in the Northern Territory, 6 regional towns in far western New South Wales, and 1 regional town in Western Australia. From the clinical records of 297 children aged under 5 years, the documented health-related concerns and follow-up actions showed that:

- 55 children (19%) had chronic ear disease, defined as a record of recurrent ear infections (2 or more in the previous year) or chronic ear infection (persisting for 2 weeks or more)
- of the 55 children with a documented chronic ear disease, a large proportion had a record of follow-up examinations (84%), advice on ear care (71%), or prescription of antibiotics (96%); only a small proportion had a record of a clear action plan or referral for audiology or ENT assessment (13% for each)
- health problems, including chronic ear disease, were more common among children in the Northern Territory than in other jurisdictions analysed.

The poor ear health of Indigenous children was corroborated by data collected during child health checks, which was a component of the Child Health Check Initiative introduced under the Northern Territory Emergency Response. Child Health Check data showed that between July 2007 and June 2009, of 9,373 Indigenous children who received health checks, 30% had ear disease. Of these children, 1,291 (14%) were referred to audiology services, and

896 (10%) were referred to an ear, nose and throat specialist at their initial health check (AIHW & DoHA 2009).

In response to the high level of need in this area, an ear and hearing health program was established as part of the Northern Territory Emergency Response in mid-2007. This program continued under the Closing the Gap in the Northern Territory National Partnership Agreement from mid-2009 to mid-2012.

By the end of CHCI(CtG), evidence from data collected through these programs showed that among children and young people who received ear and hearing health services, the prevalence of middle ear conditions decreased, and the majority experienced improvements in hearing (AIHW 2012). However, despite some improvements in recent years, ear disease and hearing loss remain health issues of concern for this population (AIHW 2014).

Since July 2012, the Australian Government has provided two sources of funding to continue improving hearing health and to reduce middle ear conditions among Indigenous children and young people in the Northern Territory.

The SFNT began in July 2012 and provides funding until 2021–22. The hearing health component of this agreement replaced, and expanded upon, services implemented under CHCI(CtG). The funding was mainly used to provide audiology and CHHC services to children and young people aged under 16.

In addition, the Northern Territory Government receives funds from the Australian Government through the Healthy Ears—Better Hearing, Better Listening programme. The Northern Territory Government has used this funding to support audiology services and ENT teleotology services for children and young people aged 21 and under, especially in remote areas, where there is a high demand and a lack of local services.

1.2 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. The information supports the monitoring of health service delivery for Indigenous children and young people in an area of critical need in the Northern Territory, and it builds the evidence required for program monitoring and evaluation.

The data are collected using paper data collection forms. The health professionals responsible for providing services complete a form with information about the child or young person's demographic characteristics, type of services provided, community where the service was provided, date of service, examination results, and medical interventions and recommendations. If consent to share data with the AIHW is obtained, the forms are then sent to the AIHW for processing. Data collection forms are included at Appendix A.

The data analysed in this report came from three sources held by the AIHW:

- hearing health outreach audiology data collection
- ENT teleotology data collection
- CHHC data collection.

The amount of data received by the AIHW 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 two 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 community where the service was provided.

Data limitations

The audiology, CHHC and ENT data collections have some limitations that should be considered when interpreting the findings presented in this report:

- Children and young people who receive audiology, ENT or CHHC services are not a random sample of Indigenous children and young people in the Northern Territory because services are targeted at children with high need. Additionally, the scope of this report is limited to programs funded by the Australian Government. Services provided through other funding sources (for example, the Northern Territory Government or the private sector) are not included. Thus, the results of this report do not represent ear and hearing health services in the Northern Territory as a whole, and they are not representative of the total Indigenous population aged 21 and under.
- As the AIHW does not receive detailed information on audiology, ENT or CHHC services if parents or guardians do not provide consent to share the data, these data were not included in most analyses in this report. The accuracy of analysis results for audiology and ENT services were not greatly affected as the extent of non-consent data was minimal, at about 1% for audiology and ENT services between July 2012 and June 2015. On the other hand, rates of non-consent were high for CHHC services (47% of services and 52% of children) between July 2012 and June 2015 (see Chapter 6 for more discussion on this issue). This should be taken into account when interpreting the analyses presented in Chapter 6. However, there have been improvements to non-consent rates over time for CHHC services, decreasing from 62% of children in 2012–13 to 25% of children in 2014–15.
- When using and interpreting the data, the extent of missing and 'not tested' responses should be taken into account. Where possible, tables show the percentage of missing and not tested responses.
- As personal information is not provided to the AIHW (such as childrens' names), service recipients are tracked using their hospital registration number (HRN). A very small number of service recipients cannot be tracked due to missing or incorrect HRNs.
- ENT data from face-to-face ENT consultations were not available when this report was written. Hence, the ENT data analysed include only those for teleotology services. To some extent, this may influence the results of analyses (for example, due to differences between teleotology and face-to-face consultations in the tools and methods used to assess hearing health and make diagnoses). Also, it is likely that teleotology services are used by children and young people in more remote areas compared with children and young people in non-remote areas, who would be more likely to receive face-to-face consultations. See Chapter 5 for more information.

1.3 Additional information about this report and report series

- In this report:
  - the Northern Territory Emergency Response Child Health Check Initiative and the Closing the Gap in the Northern Territory National Partnership Agreement are together referred to as the 'CHCI(CtG)'. For more background information on these two initiatives, see *Northern Territory Emergency Response Child Health Check Initiative—follow-up services for oral and ear health: final report 2007–2012* (AIHW 2012)
  - data are provided for 3 financial years from 2012–13 to 2014–15, but the content generally refers to the last 2 years only (2013–14 and 2014–15) when changes between years are discussed. This is because data for 2012–13 were described in the previous report *Hearing health outreach services to Indigenous children and young people in the Northern Territory: 2012-13 and 2013-14* (AIHW 2015)
  - the age of eligibility for services provided under SFNT is generally described as 'under 16'. This includes people aged up to, but not including, 16 years; therefore, analyses of SFNT data throughout this report include people aged 0–15
  - people aged 21 and under are eligible for audiology and ENT services funded under the Healthy Ears—Better Hearing, Better Listening programme; however, analyses in this report only include ages 0–20 as data on people aged 21 are not contained in the Northern Territory hearing health data collections.
- The scope of the first annual hearing health report—*Stronger Futures in the Northern Territory: hearing health services 2012–2013* (AIHW 2014)—only included services provided under SFNT. The scope of the second annual report—*Hearing health outreach services to Indigenous children and young people in the Northern Territory 2012-13 and 2013-14* (AIHW 2015)—was extended to include services provided under SFNT as well as the Healthy Ears—Better Hearing, Better Listening programme. The current annual report includes both of these hearing health programs.
- In the 2015–16 Budget, the Australian Government announced the redirection of funding under the SFNT to establish a new National Partnership Agreement on Northern Territory Remote Aboriginal Investment. It is expected that the new agreement will be in place from July 2015. Future reports will contain information on activities funded under the new National Partnership Agreement.

1.4 Report structure

The report is structured as described below:

- **Chapter 2**—Services and infrastructure: provides descriptions and information about ear and hearing health services included in this report.
- **Chapter 3**—Preventive interventions and ear health promotion: includes information about preventive interventions that were part of the hearing health programs included in this report, such as the resources and education material developed to promote ear health, and health promotion campaigns.
- **Chapter 4**—Audiology services: includes information about audiology services provided, hearing status and impairment among children and young people who

received these services and how this has changed over time, and types of further care recommended by audiologists.

- **Chapter 5**—Ear, nose and throat teleotology services: includes information about teleotology services provided, and recommendations provided by ENT specialists for clinical management and further actions.
- **Chapter 6**—Child Hearing Health Coordinator program: includes information about the number of children who participated in the program, clinical service activities provided, contacts made with other service providers, and the ear health of children.
- **Chapter 7**—Ear conditions: uses combined data from audiology and ENT teleotology services to analyse the prevalence of ear conditions among children and young people who received these services, hearing status among children and young people diagnosed with conditions, and changes over time in the prevalence of ear conditions among those who received multiple services.
- **Chapter 8**—Performance benchmarks for National Partnership Agreement on Stronger Futures in the Northern Territory: includes information about whether the audiology services delivered and outcomes achieved from 2012–13 to 2014–15 reached targets agreed by the Australian and Northern Territory departments of health for SFNT.

The order of the chapters does not represent the order in which children and young people move through the hearing health programs, as there is no specific pathway that must be followed through different services. For example, some children and young people receive only 1 type of service, while others move between multiple service types or receive services concurrently. A client's pathway of care depends on factors including the presenting otitis media condition, the disease progression, other service providers accessed, the family's level of engagement with services, mobility of clients, and the capacity of clients to attend during infrequent and time-limited visits from hearing health outreach teams.

The data collection forms for audiology, CHHC and ENT teleotology services are provided in Appendix A, and data quality statements for the collections are in Appendix B.

2 Services and infrastructure

It is a challenge to provide hearing health services to remote communities in the Northern Territory due to the nature of otitis media and the geographical location and vast spread of Indigenous communities.

The nature of otitis media makes it a complicated disease to manage. The disease can persist for an extended time, requiring major commitments of time and effort from caregivers of children and young people to attend the repeated appointments necessary to successfully treat and monitor the disease. It requires coordinated efforts from multiple types of medical professionals such as general practitioners, paediatricians, audiologists, Clinical Nurse Consultants (CNCs), remote area nurses, Indigenous health practitioners, child health nurses and ENT specialists.

The associated conductive hearing loss that may be experienced as a result of otitis media adds to complications, as adjunct diasability support services such as hearing aids may be required. Hearing loss also often requires adjustment (in practices and procedures, and by the child and people interacting with the child) in a non-medical environment, especially in school and the home, but also broadly in social and emotional interactions, and later in vocational pursuits. To manage otitis media effectively, it is critical to provide health education and promotion together with coordinated medical interventions.

Additional challenges in managing ear disease and delivering services to Indigenous communities in the Northern Territory include:

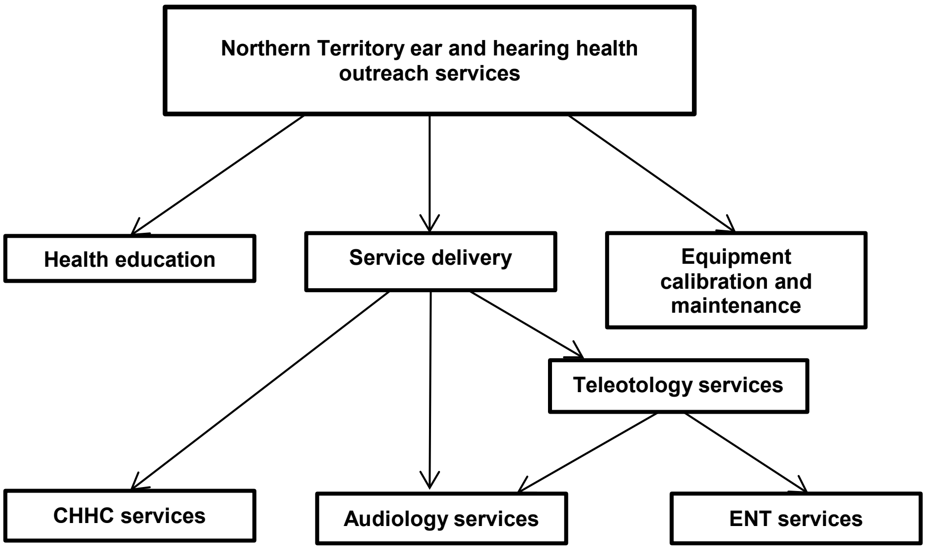
- logistic limitations due to inclement weather and road closures
- families not wishing to access follow-up services on the days available
- children and their families unable to be found during community outreach visits because of high mobility of Indigenous families
- access restrictions during community events such as ceremonies, deaths and major sports events.

This chapter provides details about how hearing health outreach services were provided despite these challenges. It includes descriptions of current ear and hearing health outreach programs, and the facilities and transportation used for service delivery.

2.1 Ear and hearing health outreach programs

The ear and hearing health outreach programs in the Northern Territory that are included in this report have three components: audiology services, CHHC services and teleotology services. Apart from delivering these services, outreach teams provide health education and promotion services to various target audiences in the communities they visit, including health professionals, school staff and the general public. As well, resources are dedicated to maintaining medical equipment to ensure these services run smoothly (Figure 2.1)

Table 2.1 summarises information about these services, including the scope, service providers and the specific functions of each service type.



Notes

1. Children and young people may receive more than 1 type of service.
2. Services presented here are only the hearing health services included in this report, not an exhaustive representation of all hearing health services available in the Northern Territory.

Figure 2.1: Hearing health outreach services funded by the Australian Government in the Northern Territory

Table 2.1: Hearing health outreach services funded by the Australian Government in the Northern Territory[(a)]

Scope of service recipients	Service provider/staff	Services provided
Ear and hearing health education (Chapter 3)		
Health, hospital, school and child care staff; trainee Aboriginal health workers; community members	Hearing health outreach team members, which can include audiologists, CHHCs, Aboriginal health workers, and ENT nurses	Education about topics such as ear health, service and treatment pathways, service and treatment types, and the impact of hearing loss
Audiology services (Chapter 4)		
Indigenous children and young people in the Northern Territory aged 21 and under Services for children and young people aged under 16 are funded through the SFNT National Partnership Agreement Services for those aged 21 and under are funded through the Healthy Ears – Better Hearing, Better Listening programme	Outreach teams consisting of an audiologist and at least one other member of staff, such as a registered nurse, nurse audiometrist, Aboriginal health worker, or a community hearing worker	• Assessment of middle ear function • Diagnosis of hearing loss and middle ear conditions • Recommendations for clinical care and rehabilitation (for example, communication strategies, classroom amplification, hearing aids, speech therapy and education support) • Outreach teams working with local families, primary health organisations, community personnel, schools and early childhood organisations
Teleotology services (Chapter 5)		
Indigenous children and young people in the Northern Territory aged 21 and under	• CNC (ENT) • Audiologist • ENT specialist	• ENTspecialist advice and oversight • Diagnosis and assessment of hearing loss • Diagnosis and assessment of middle ear conditions • Recommendations for treatment (for example, medications, surgery, hearing aids) • Care coordination

(continued)

Table 2.1 (continued): Hearing health outreach services funded by the Australian Government in the Northern Territory[(a)]

Scope of service recipients	Service provider/staff	Services provided
CHHC services (Chapter 6)		
Indigenous children who have a priority listing (that is, a diagnosed middle ear condition or documented hearing impairment) See Chapter 6 for more information	CHHCs (currently, there are 7 CHHCs, who each manage about 100 children)	Coordination of treatment strategies by: • facilitating contact with service providers (for example, education or health services, community-based workers and Australian Hearing) • monitoring and assessing ear health status and priority status of children aged under 5 years in remote communities • overseeing primary health practitioners and collaborating with them to ensure treatment is provided at critical times in the disease process • supporting and providing training to primary health practitioners in identifying and managing otitis media • providing support and training for population-level surveillance through routine and systematic ear examinations by primary health practitioners as part of 'Well baby assessments' Services also include hearing health prevention and promotion

(a) Services presented here are only the types of hearing health services included in this report, not an exhaustive representation of all hearing health services available in the Northern Territory.

Ear and hearing health education

Hearing health outreach programs in the Northern Territory provide education programs for health and hospital staff, school and child care staff, trainee Aboriginal health workers, as well as community members. The purpose of education sessions vary. Some activities are targeted at health and hospital staff and cover topics such as the services and referral pathways available through different hearing health programs, and the diagnosis, treatment and management of ear disease. For school staff, education sessions provide information about the relationships between ear disease, hearing and school. For members of the general community, education is provided about the impact of hearing loss and ear diseases.

Audiology services

Audiology services include assessing middle ear function, diagnosing hearing loss and middle ear disease, and recommending clinical care and rehabilitation (such as communication strategies, classroom amplification, hearing aids, speech therapy and education support).

The majority of audiology outreach services are funded by the Australian Government Department of Health through the SFNT program and are available to all Indigenous children and young people in the Northern Territory aged under 16. 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, nurse audiometrist, Aboriginal health worker, or a community hearing worker.

In addition, audiology services are delivered as a part of teleotology services that are funded by Australian Government Department of Health through the Healthy Ears—Better Hearing, Better Listening programme and are available to all Indigenous children and young people in the Northern Territory aged 21 and under. During teleotology outreach visits, audiologists assess hearing for children and young people with referrals and those who need pre- and post-surgical checks. They also generate the referrals for primary health care and tertiary services, such as rehabilitation (Australian Hearing), speech pathology and education specialists.

In both programs, outreach teams work with local families, primary health organisations, community personnel, schools and early childhood organisations. The Aboriginal Interpreting Service is used routinely for all outreach visits to remote communities as English is generally a second or third language.

Teleotology services

The teleotology service model was developed to meet demand for ENT services in remote Northern Territory communities and, in particular, to ensure post-surgical follow-up assessment and evaluation of surgical interventions. It enables asynchronous ENT consultations, recommendations and case management. The services are delivered by a team of ear and hearing health professionals, which usually includes a Clinicial Nurse Consultant (CNC) ENT, audiologist and ENT specialist. The ENT Department at the Royal Darwin Hospital leads the clinical governance for the delivery of teleotology services.

During an outreach visit from an audiologist and CNC ENT, the CNC ENT collects relevant case history information and uses a video-otoscope to take digital images of a child’s eardrum. If required, an audiologist provides a hearing assessment. This information is stored electronically and provided to an ENT specialist located elsewhere. The recommendations from the ENT specialist are communicated back to primary health practitioners through the CNC ENT. This information is updated in patient information recall systems (Primary Care Information System, and Communicare). If surgery is deemed appropriate based on the teleotology assessment, the child is added to an elective surgery waiting list.

The availability of teleotology services means that many families do not need to travel to regional centres for services and reduces the amount of face-to-face ENT outreach required. It has shown both cost and productivity benefits, enabling more children and young people in remote areas to access ENT services.

Child Hearing Health Coordinators (CHHCs)

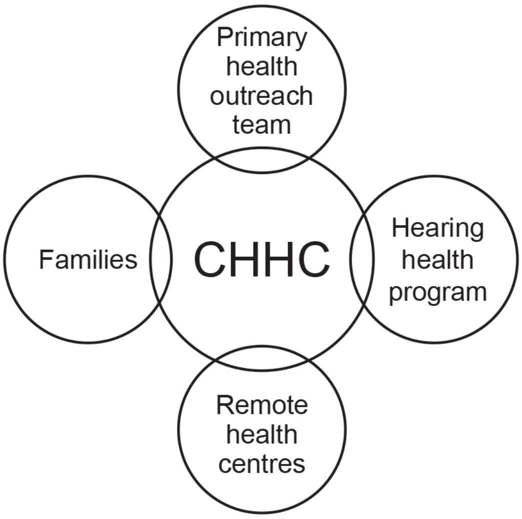
CHHC services were developed in response to the challenges encountered in preventing ear disease and implementing clinical care for otitis media in the Northern Territory. The initiative aims to coordinate management and provide continuity of care for children with an identified risk of chronic otitis media and hearing loss. Coordinators also:

- raise awareness of hearing health in communities in the Northern Territory
- promote skills and system development in primary health organisations to support population-level otitis media surveillance
- implement early detection, treatment and prevention strategies.

The CHHC initiative is based on a case management approach, where an expert coordinator oversees the treatment of children with a prioritised need for care by linking primary health care services with specialist resources. The CHHCs administer clinical services such as verifying diagnoses of ear conditions, providing ear health education, and discussing strategies to minimise hearing loss with children and their parents or guardians. They also facilitate contact with service providers, such as education or health services, community-based workers and Australian Hearing (Figure 2.2).

Indigenous children are referred to a CHHC if they have a priority listing—that is, a diagnosed middle ear condition or documented hearing impairment (see Chapter 6 for information on priority categories).

There are 7 CHHCs who work in 7 regions (Figure 2.3 shows 4 of them): Top End west, Top End central, Katherine, East Arnhem, Barkly and Central Australia north and south (Figure 2.4).

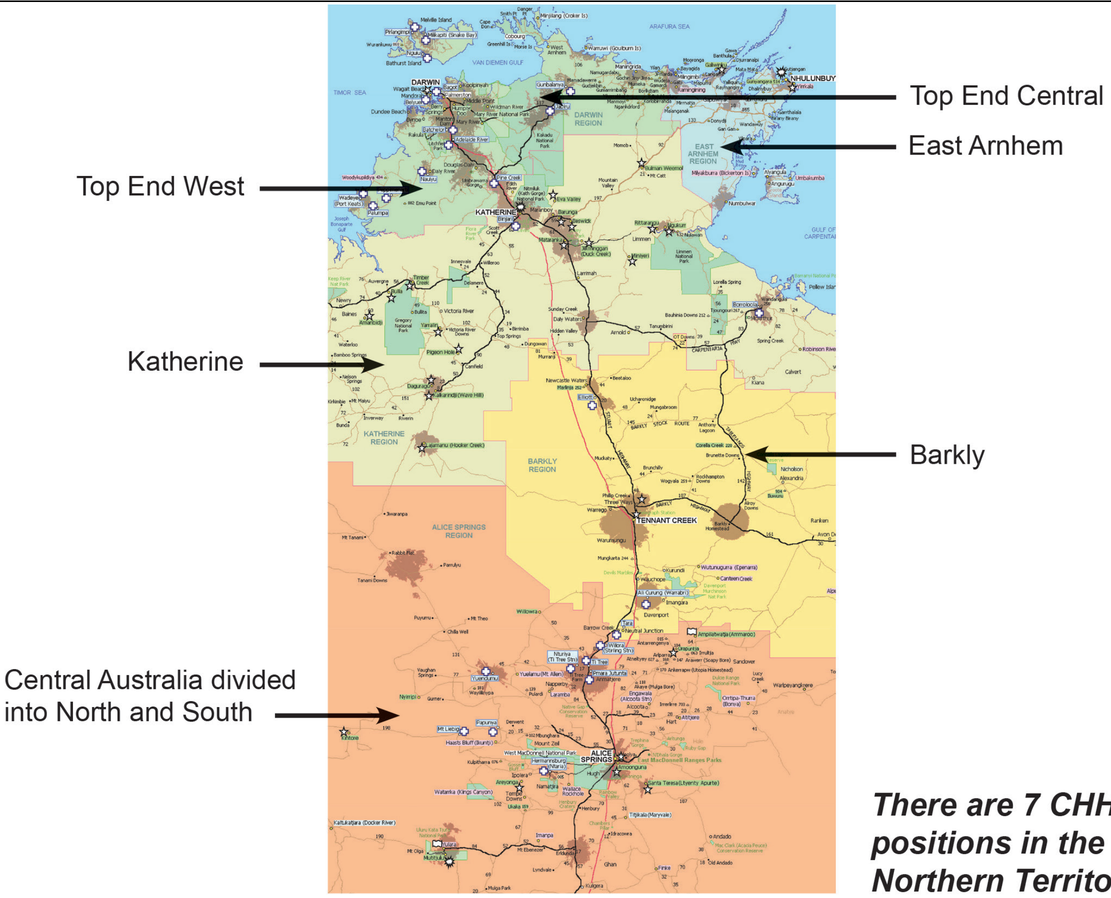


Source: Northern Territory Department of Health.

Figure 2.2: Roles of CHHCs in Northern Territory hearing health services

Source: Northern Territory Department of Health.

Figure 2.3: Some of the Child Hearing Health Coordinators



There are 7 CHHC positions in the Northern Territory

Source: Northern Territory Department of Health.

Figure 2.4: Regions where CHHCs provide services

2.2 Hearing Health Information Management System

The Hearing Health Information Management System developed by the Northern Territory Department of Health (NT DoH) enables health information and service details for children and young people with ear and hearing conditions to be recorded, and for children to be followed up after diagnosis. When fully established, the system will hold data from services including, but not limited to, hearing health services (for example, it will include data from primary health care providers and hearing rehabilitation services), and it will assist with case management and continuity of care for children and young people accessing the services.

2.3 Hearing health facilities

Specialised hearing health facilities are important to the provision of audiology services, especially for children aged under 3. Specialised clinical equipment such as tympanometers and video-otoscopes are in many primary health care organisations across the Northern Territory. Nineteen audiological facilities have been installed in remote Northern Territory communities (Figure 2.5). There are also a number of hospital or community health based audiological test facilities in Alice Springs, Darwin, Katherine, Nhulunbuy, and Tennant Creek. The map at Appendix C shows the location of hearing assessment facilities in the Northern Territory.

Source: Northern Territory Department of Health.

Figure 2.5: Audiological facilities in remote Northern Territory communities

2.4 Transport

It is a challenge to provide ear and hearing health services to a population living in remote areas. The majority of remote communities do not have a resident audiologist or ENT specialist, therefore audiology and ENT services are mainly provided by outreach teams who periodically visit these communities with equipment. The outreach teams have to travel by car, boat or light aircraft in order to reach these remote communities. It is particularly difficult when outreach teams carry heavy equipment and face unpredictable weather and corrugated dirt roads.

3 Preventive interventions and ear health promotion

Family participation in ear and hearing health services is essential for positive outcomes, and is underpinned by the community's knowledge of ear health, care choices and services available, and the consequences of hearing disability. The hearing health programs included in this report acknowledge the central role of families and community in sharing ear and hearing health promotion messages.

A community-lead arts-based health promotion project was an important collaboration between service providers and the Galiwin'ku community in 2014–15. This involved the painting of a Hearing Booth—originally a white shipping container—into a vibrant canvas of hearing health messages (Figure 3.1). The mural incorporated illustrations and key messages about the impact of ear disease on the early years of a child's life, and the need for families to give children a good start in life. This activity resulted in culturally appropriate and creative discussions about ear health, in both English and local Yolŋu Matha language. The Hearing Booth now stands as a platform for expression and information sharing among people of all ages, where the community members teach each other, children learn from their peers, and Elders share their stories.

Family contact with service providers presents a key opportunity to deliver ear health information and health promotion messages and, in the process, improve their health literacy. To better capitalise on this opportunity, in 2014–15, hearing health programs implemented processes to routinely use interpreters during outreach services to communities. The use of interpreters has been demonstrated to increase two-way information exchange and participation in self-care. For example, with the use of interpreters, children and their families have a better understanding of their treatment regimes and the importance of adhering to them, and are therefore more likely to do so.

Key hearing health promotion initiatives that commenced in 2014–15 include:

- a formal training package for Aboriginal Community Hearing Workers to understand conductive hearing loss and reinforce ear disease prevention strategies
- the Stop the First Infection initiative to prevent early childhood infections during the first 6 months of life
- ear and hearing health prevention and promotion including displays of video-otoscope health merchandise during community events in Darwin, Katherine, Tennant Creek and Alice Springs
- a formal partnership with local football organisations including Northern Territory Thunder and AFL Northern Territory to develop and promote a hearing health social marketing campaign, with football players as hearing health ambassadors. Television commercials, web promotions and radio advertisements are currently being developed for this marketing campaign
- digital books with key ear health and hearing messages are being created in specific communities.

Source: Northern Territory Department of Health.

Figure 3.1: Galiwin'ku community Hearing Booth arts-based health promotion project

Preventive interventions and ear health promotion activities are an important part of efforts to improve the health of Indigenous children and young people. Hearing health outreach programs in the Northern Territory provide a number of such initiatives, including a suite of community resources and facilitation of educational activities.

Table 3.1 summarises the hearing health promotion and prevention activities that were provided in 2014–15; these activities were attended by 1,083 participants. The purpose and target audience of education sessions and promotion activities varied. For example:

- Health and hospital staff attended training on otitis media clinical care (157 participants), the different hearing health programs (70 participants), and otosocopy and video-otoscopy (39 participants).
- School staff attended training on the relationships between ear disease, hearing and school (47 participants).
- Community members, schools, and Families as First Teachers workers attended education sessions on understanding hearing loss (150 participants), and hearing health promotion activities (478 participants).

Table 3.1: Summary of hearing health promotion and prevention activities, 2014–15

Activity or topic of education session	Target audience	Number of participants
In-service or education session		
Hearing health programs (including teleotology)	Health and hospital staff	70
Otosocopy and video-otoscopy	Health and hospital staff	39
Tympanometry	Health staff	42
Otitis media clinical care	Health and hospital staff	157
Ear disease, hearing and school	School staff	47
Ear and hearing health	Community Workers and Trainee ATSIHP	27
Understanding hearing loss	Community, school, Families as First Teachers workers	150
Awareness, prevention and promotion		
Hearing health promotion	Community, school, Families as First Teachersworkers	478
Preventing ear disease	Community, school, Families as First Teachersworkers	73
Total		**1,083**

Notes

1. Health staff may include remote area nurses, Aboriginal and Torres Strait Islander Health Practitioner, District Medical Officer, Child and Maternal Health Nurse.
2. School staff may include early childhood teachers, Families as First Teachers workers, Aboriginal education workers, and school teachers (primary and secondary).

Source: NT DoH, unpublished data.

4 Audiology services

Key findings

- In 2014–15, a total of 2,904 outreach audiology services were provided to 2,421 Indigenous children and young people. From July 2012 to June 2015, 6,964 services were provided to 4,427 children and young people.
- Hearing loss (see Box 4.2) was present in 46% of children and young people who received outreach audiology services at their latest service in 2014–15—a decrease from 55% in 2013–14.
- 29% of children and young people who received services in 2014–15 had some form of hearing impairment (see Box 4.2 for definitions)—a decrease from 33% in 2013–14.
- Among more than 1,200 children and young people who received 2 or more audiology services between July 2012 and June 2015, there was a 26% decrease in the proportion with hearing loss between their first and last services (from 80% at first service to 59% at last service).
- Among the 626 children and young people who received 2 or more outreach audiology services between July 2012 and June 2015 and who had a hearing impairment, 56% experienced an improvement in their degree of hearing impairment.
- Among the 1,430 children and young people aged 0–15 who received 3 or more services from August 2007 to June 2015, 85% had hearing loss at their first audiology service, which decreased to 56% at the last service.

This chapter focuses on the provision of Australian Government-funded outreach audiology services to Indigenous children and young people in the Northern Territory. It includes the number of services and service recipients, and the hearing loss and impairment they experienced. For information on ear conditions diagnosed among outreach audiology service recipients, see Chapter 7.

Throughout this report, the term 'services' refers to occasions of service rather than service providers. Apart from aggregate numbers of services, data in this report include only children and young people for whom consent was obtained from parents or guardians.

People aged 21 and under are eligible for audiology services funded under the Healthy Ears—Better Hearing, Better Listening programme; however, analyses in this report only include ages 0–20 as data on people aged 21 are not contained in the Northern Territory hearing health data collections.

4.1 Outreach audiology data collection

The outreach audiology data collection includes:

- information about the child (hospital registration number, date of birth and sex)
- information about the service (community where service was provided and date of service)
- outcomes from the audiology check, including hearing loss status, hearing loss type, degree of hearing impairment (see Box 4.2 for definitions), and middle ear conditions diagnosed
- further action(s) recommended.

A child or young person may receive a number of audiological assessments and have more than one record in the audiology data collection. Each record in the collection corresponds to a single assessment of middle ear function and peripheral hearing (audiological assessment). A course of care for otitis media may consist of one or a series of audiological assessments to monitor hearing loss and to assess middle ear function as part of primary clinical care or ENT specialist care pathways.

4.2 Audiology services provided

This section reports the number of audiology services provided and the demographic characteristics of Indigenous children and young people who received services.

Number of services

In 2014–15, a total of 2,904 outreach audiology services was provided to 2,421 children and young people aged 20 and under (Table 4.1). Among children and young people for whom consent to share information was obtained, the average number of services per recipient was 1.2, with 1,970 (82%) receiving 1 service (Table 4.2).

From July 2012 to June 2015, 6,964 services were provided to 4,427 children and young people. Over this period, among those for whom consent was obtained, there was an average of 1.6 services per child or young person, with 65% receiving 1 service (tables 4.1 and 4.2). Consent was provided to share information with the AIHW for almost all service recipients.

A variety of factors contribute to changes in the number of audiology services provided each year. These include the availability of children and their families during outreach visits, logistical issues experienced by outreach teams with accessing communities (such as inclement weather and road closures), and access restrictions during community events.

Table 4.1: Number of audiology services and children and young people who received services, 2012–13 to 2014–15

	Services			Service recipients		
	Consent	Non-consent	Total	Consent	Non-consent	Total
			Number			
2012–13	1,919	14	1,933	1,646	14	1,660
2013–14	2,106	21	2,127	1,747	21	1,768
2014–15	2,883	21	2,904	2,400	21	2,421
Cumulative total	**6,908**	**56**	**6,964**	**4,371**[(a)]	**56**	**4,427**[(a)]
			Per cent			
2012–13	99.3	0.7	100.0	99.2	0.8	100.0
2013–14	99.0	1.0	100.0	98.8	1.2	100.0
2014–15	99.3	0.7	100.0	99.1	0.9	100.0
Cumulative total	**99.2**	**0.8**	**100.0**	**98.7**	**1.3**	**100.0**

(a) The total number of service recipients in 2012–13, 2013–14 and 2014–15 combined does not sum to the rows because some children and young people received services in multiple financial years; these service recipients were counted only once in the total.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table 4.2: Average and maximum number of audiology services received, and proportion of children and young people who received 1 service, 2012–13 to 2014–15

	2012–13	2013–14	2014–15	Cumulative total (2012–15)[(a)]
Average number of services per child or young person	1.2	1.2	1.2	**1.6**
Maximum number of services	5	5	3	**11**
% of children and young people who received 1 service	86.3	81.8	82.1	**65.0**

(a) Cumulative total includes data on people who received audiology services from 1 July 2012 to 30 June 2015. It does not equal the sum of the financial years, For example, the maximum number of services is that for 2012–15, not the sum of the maximum number of services from 2012–13 to 2014–15 combined.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

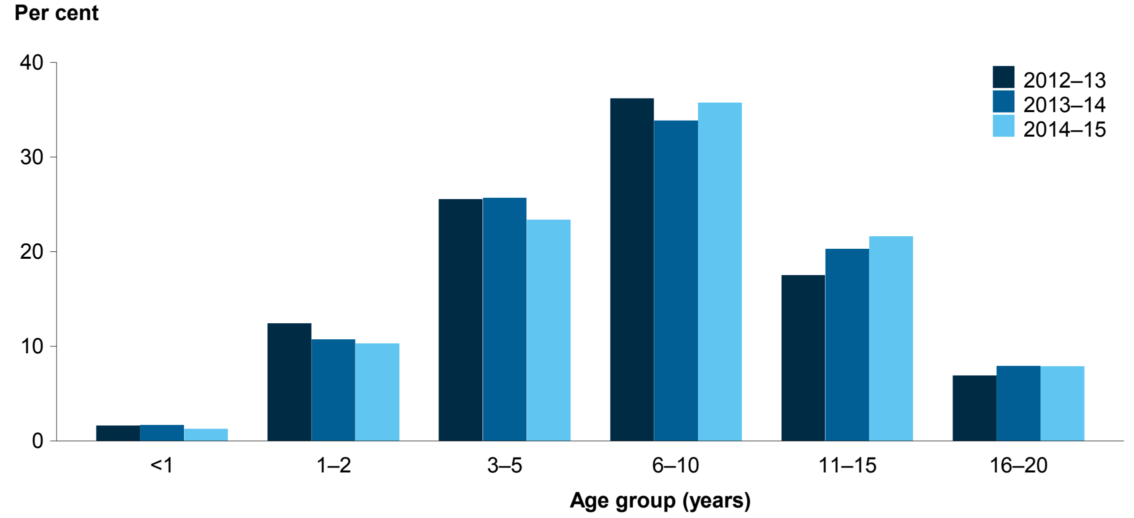
Age and sex

In 2014–15, of the 2,400 children and young people who received audiology services and for whom consent to share data was obtained:

- More than one-third (36%) were aged 6–10, and just under a quarter were aged 3–5 (23%) or 11–15 (22%).
- Those in younger and older age groups accounted for a lower proportion of service recipients. Children aged under 1 year of age accounted for 1% of service recipients, 10% were aged 1–2 and 8% were aged 16–20 (Appendix Table E4.1; Figure 4.1).

The distribution of service recipients by age group in 2014–15 was similar to that for 2012–13 and 2013–14.

There was no difference in the proportion of audiology services received by males and females (50% each) in this program (Appendix Table E4.1).



Note: Data are reported only where consent was obtained.

Source: Appendix Table E4.1.

Figure 4.1: Children and young people who received audiology services, by age, 2012–13 to 2014–15

4.3 Results of hearing assessment

It is important to measure different aspects of a child's hearing because it can influence their long-term language development, cognition, socialisation, education and future employment. Understanding the type of hearing loss that a person has, and the extent to which they experience impaired hearing, can help health professionals treat and manage hearing health, thereby mitigating adverse developmental impacts.

This section provides analyses of hearing loss status, type of hearing loss, and degree of hearing impairment among children and young people who received audiology services, based on their latest audiology assessment results (see Box 4.1 for information about methods of audiological assessment). It also contains information on changes over time in children and young people who received multiple audiology services.

Children and young people who participated in the hearing health programs included in this report are not a random sample of Indigenous children and young people in the Northern Territory; therefore, the results are not representative of the whole population of Indigenous children and young people. Additionally, since January 2013, children and young people have been prioritised according to their need for services, which means that those with worse ear and hearing health are more likely to be seen first. Therefore, the results of analyses over time could be influenced by a change in the process used to determine the order in which children and young people receive services. Caution should therefore be taken when interpreting the data.

Box 4.1: Methods of audiological assessment

During audiology services, middle ear and hearing status are investigated and examined by an audiologist. This includes:

- detailed clinical history of ear health, family history, general health, noise exposure, speech development and language development
- visual examination of the ear canal and tympanic membrane
- examination of mobility of ear membrane
- examination of functional hearing acuity.

Testing hearing loss: pure tone audiometry

Pure tone audiometry is the standard technique of testing hearing ability among children and young people who are old enough to cooperate with the test procedure. It records a subjective response to threshold (softest) sound stimuli presented through a headphone, bone conductor or speaker at discrete frequencies that are essential for detecting and discriminating speech. Any response deviation from the normal range, at any sound stimuli, in either ear, is described as a hearing loss, and the type of hearing loss is diagnosed.

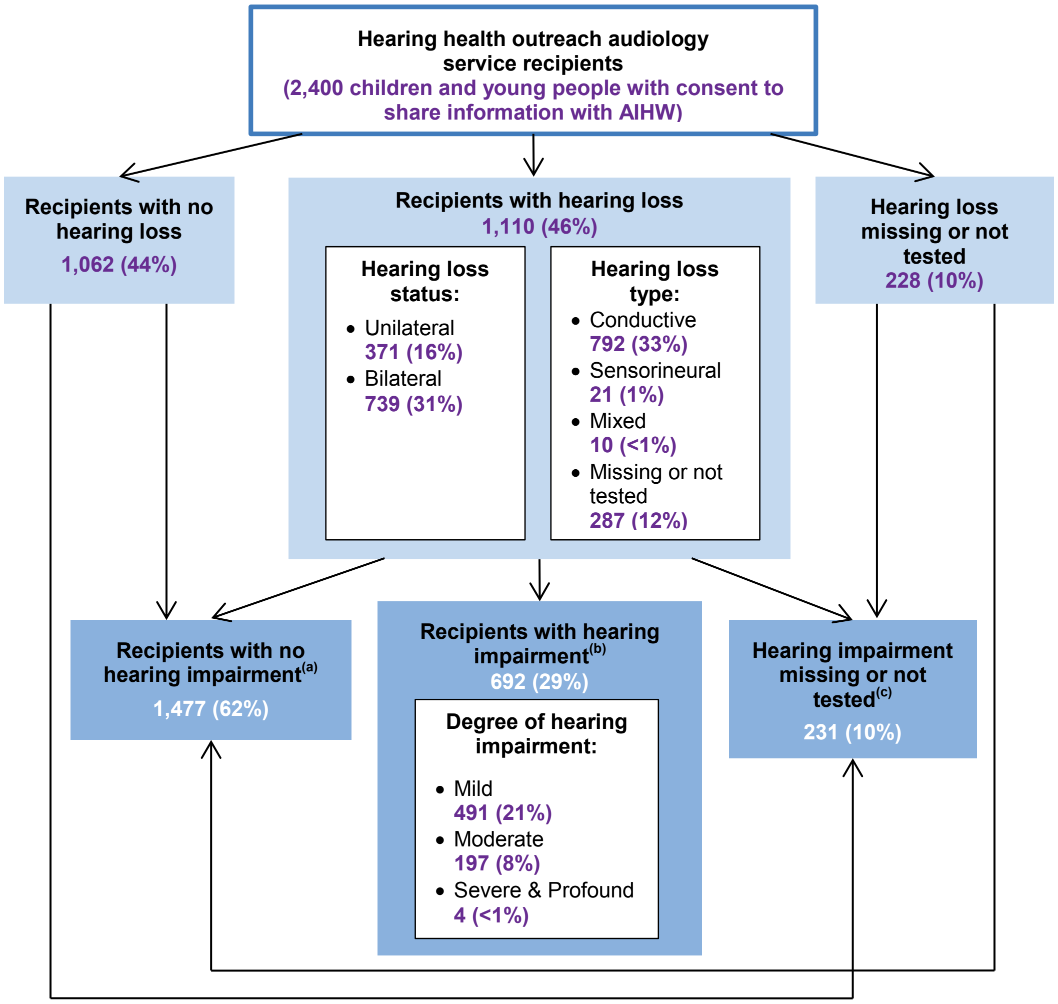
Testing hearing loss in younger children: visual reinforced orientation audiometry

Visual reinforced orientation audiometry (VROA) is used to assess hearing in children aged between 9 months and 3 years. Results are obtained in a sound field where both ears are presented to test stimulus simultaneously through a calibrated speaker. As the results recorded are obtained in a sound field (both ears are being presented with stimuli without differentiation), diagnostic audiology results do not provide detailed information on separate ears and generally reflect the ear with the best hearing acuity.

Hearing loss status, type of hearing loss, and hearing impairment

Hearing loss may affect one ear (unilateral) or both ears (bilateral), and there are three types of hearing loss: sensorineural, conductive and mixed. Hearing impairment describes a functional limitation that could affect activity or participation; it uses a scale of mild, moderate, severe and profound (see Box 4.2 for definitions). Figure 4.2 shows the relationship between these components of hearing health, and the number of service recipients in each category in 2014–15. Because hearing impairment is based on the better hearing ear, children and young people with unilateral hearing loss would usually have no hearing impairment; it is only those with bilateral hearing loss who would usually have some degree of hearing impairment (that is, mild, moderate, severe or profound).

The analyses in the following sections are based on the most recent service if a child or young person received more than one service.



(a) From recipients with hearing loss, this category contains only those with unilateral hearing loss (as hearing impairment is based on the better hearing ear).

(b) From recipients with hearing loss, this category contains only those with bilateral hearing loss.

(c) From recipients with hearing loss, this category could contain those with either unilateral or bilateral hearing loss.

Figure 4.2: Relationship between hearing loss (type and status) and hearing impairment in the audiology data collection, and number of service recipients in each category in 2014–15

Box 4.2: Definitions of hearing loss and degrees of hearing impairment

Hearing loss status

- *Unilateral*: hearing loss in one ear
- *Bilateral*: hearing loss in both ears
- *Tested by sound field*: where children are tested using VROA (see Box 4.1), it is not possible to determine whether hearing loss is unilateral or bilateral; instead, the test indicates hearing acuity in the better ear.

Type of hearing loss

- *Sensorineural*: deviation of hearing threshold from the normal range attributable to problems in the inner ear or the cochlear nerve
- *Conductive*: 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)
- *Mixed*: deviation of hearing threshold from the normal range that has combined conductive and sensorineural components.

Degree of hearing impairment

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 Hertz (Hz), 1000 Hz and 2000 Hz.

In the AIHW's hearing health data collections included in this report, a person's degree of hearing impairment is classified based on the categorical variable in the data collection form provided by the NT DoH (see Appendix B). The NT DoH applies a conservative categorisation of hearing impairment, as it is regarded to be more suitable for children aged under 15 (Australian Hearing, cited in Access Economics 2006). For example, this means that a child classified with moderate hearing impairment by NT DoH might have been classified as having mild hearing impairment in the standard system (see Table D4.1 in Appendix D). The system used by NT DoH is as follows:

- *Mild*: On average, the quietest sounds that people can hear with their better ear are between 16–30 dB HL in soundproof conditions and 26–35 dB HL in non-soundproof conditions. They are able to hear and repeat words spoken in normal voice at 1 metre. Counselling and hearing aids may be needed.
- *Moderate*: On average, the quietest sounds that people can hear with their better ear are between 31–60 dB HL in soundproof conditions and 36–60 dB HL in non-soundproof conditions. They 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.
- *Severe*: On average, the quietest sounds that people can hear with their better ear are between 61–90 dB HL either in soundproof conditions or non-soundproof conditions. They 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.
- *Profound*: 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. They are unable to hear and understand even a shouted voice. Hearing aids may help with hearing words. Additional rehabilitation and cochlear implants as appropriate, combined with communication skills such as lip-reading and signing provide valuable support to the profoundly deaf.

Hearing loss status

Table 4.3 shows that in 2014–15, hearing loss was present in almost half (46%) of the children and young people who received audiology services at their latest service: 31% had bilateral loss and 16% unilateral loss. Between 2013–14 and 2014–15, the proportion of children and young people with hearing loss decreased from 55% to 46%, with a decrease in the proportion of service recipients with both unilateral and bilateral hearing loss.

Patterns of hearing loss varied by age:

- In 2014–15, rates of hearing loss were lowest among children aged under 1 (23%), and highest among children aged 3–5 (55%) and 16–20 (47%) (Appendix Table E4.2; Figure 4.3).
- The proportions of children and young people in each age group who had hearing loss were lower in 2014–15 than in 2013–14.

Table 4.3: Hearing loss status[(a)], children and young people who received audiology services, 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[(b)]	
Hearing loss status	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Hearing loss[(c)]	850	51.6	959	54.9	1,110	46.3	1,973	45.1
Unilateral (one ear)	255	15.5	333	19.1	371	15.5	654	15.0
Bilateral (both ears)	595	36.1	626	35.8	739	30.8	1,319	30.2
No hearing loss	588	35.7	618	35.4	1,062	44.3	2,016	46.1
Missing[(d)]/not tested[(e)]	208	12.6	170	9.7	228	9.5	382	8.7
Total number received an audiology service	**1,646**	**100.0**	**1,747**	**100.0**	**2,400**	**100.0**	**4,371**	**100.0**

(a) Where child received multiple audiology services, data are from latest service.

(b) Total includes all children and young people who received audiology services from 1 July 2012 to 30 June 2015. It does not equal the sum of the services for the financial years, as data are based on the latest service in the period analysed and children and young people could have received services in multiple financial years.

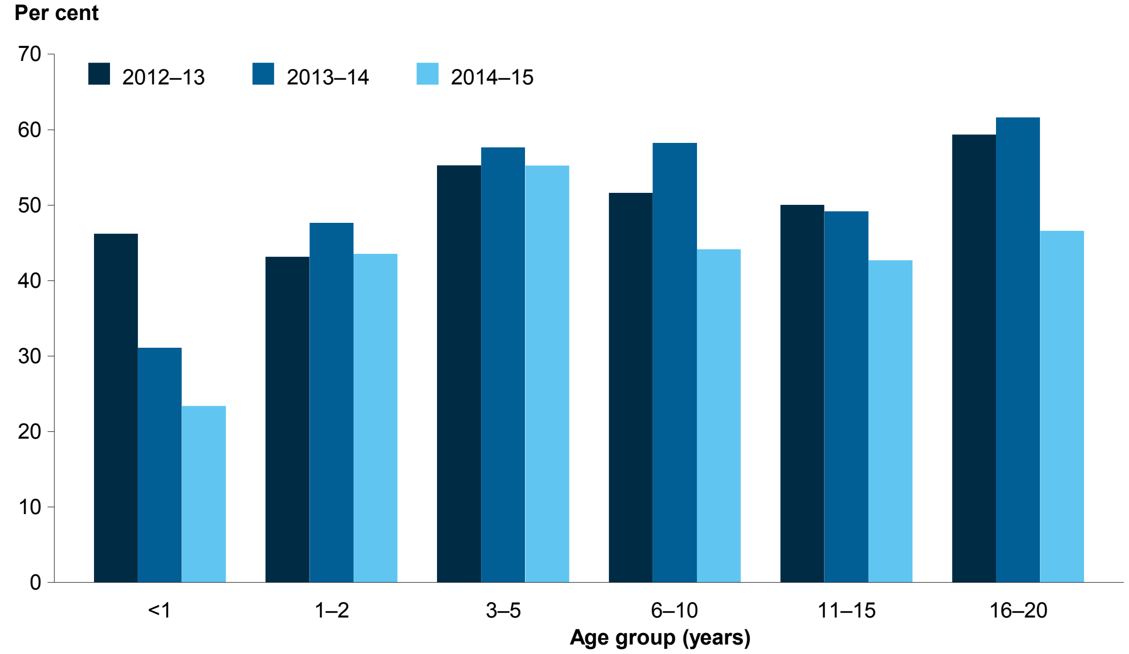
(c) Total children and young people with unilateral and bilateral hearing loss.

(d) Missing includes not stated, unsure and invalid responses.

(e) Some children and young people might not be tested because they may find it difficult to cooperate with the procedure.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).



Note: Data are reported only where consent was obtained.

Source: Appendix Table E4.2.

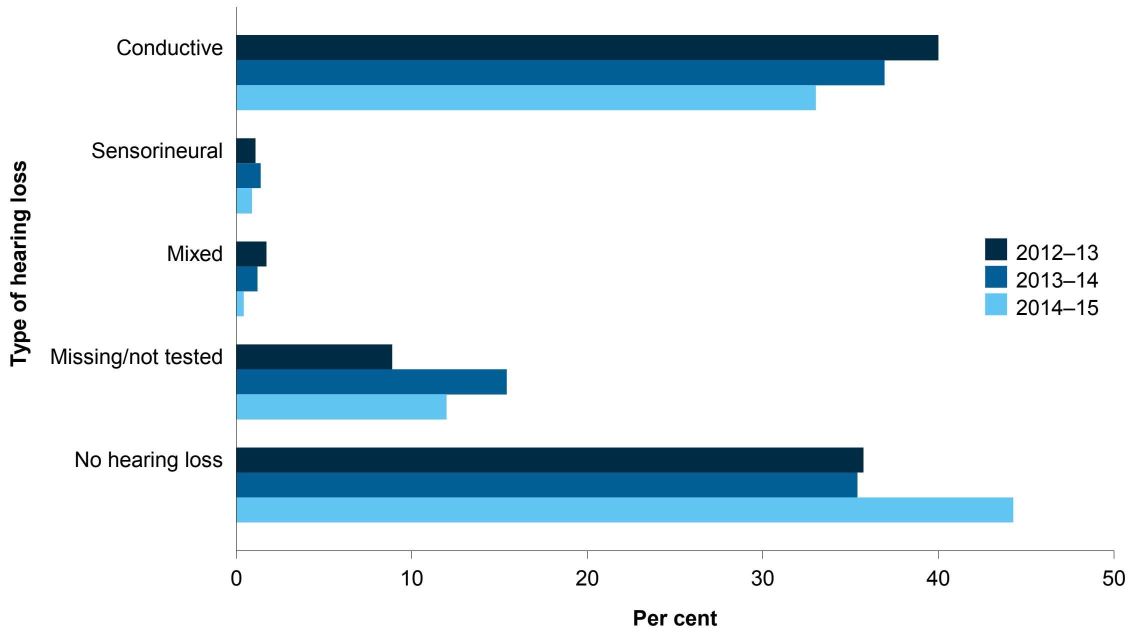
Figure 4.3: Proportion of children and young people who received audiology services with hearing loss, by age, 2012–13 to 2014–15

Type of hearing loss

In 2014–15, 792 children and young people (33%) who received outreach audiology services had conductive hearing loss at their latest service; this was a decrease in the proportion from 2013–14, in which 645 (37%) had conductive hearing loss (Figure 4.4; see Box 4.2 for definitions).

From July 2012 to June 2015, of the 4,371 children and young people who received audiology services:

- almost half (45%) had hearing loss
- one-third (32%) had conductive hearing loss, and a small proportion had sensorineural or mixed hearing loss (1% each)
- 9% had missing or not-tested hearing-loss type
- almost half (46%) did not have hearing loss (Appendix Table E4.3).



Note: Data are reported only where consent was obtained.

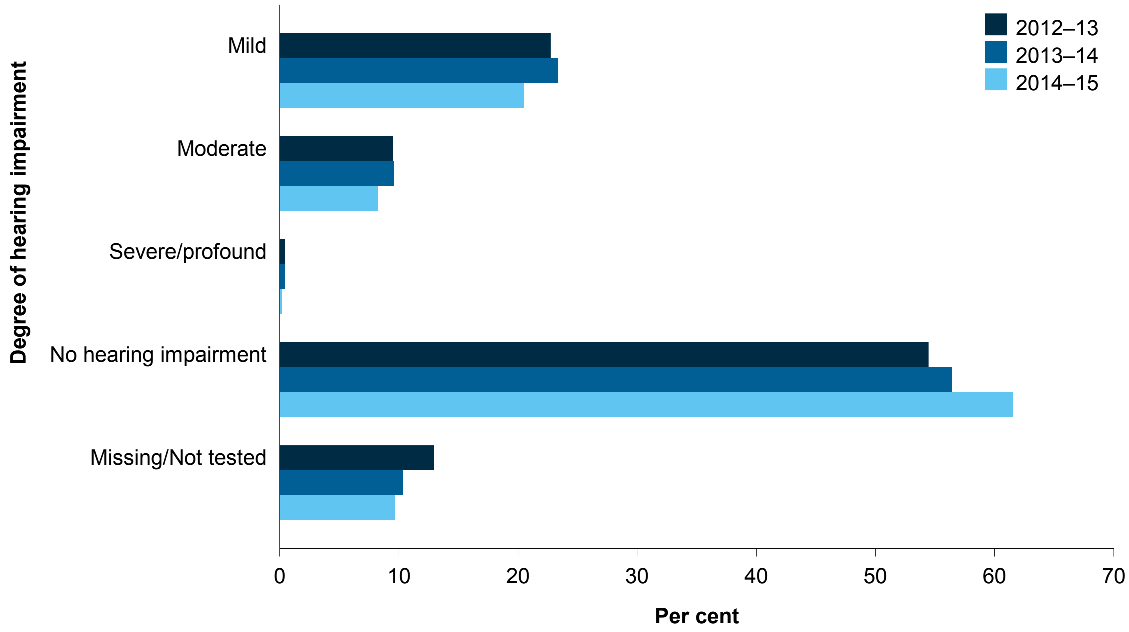
Source: Appendix Table E4.3.

Figure 4.4: Type of hearing loss among children and young people who received outreach audiology services, 2012–13 to 2014–15

Hearing impairment

In 2014–15, among children and young people who received outreach audiology services, 29% had some form of hearing impairment—21% mild, 8% moderate, and less than 1% severe or profound (Appendix Table E4.4; Figure 4.5).

The proportion of children and young people with a hearing impairment in 2014–15 decreased by 4 percentage points from 2013–14, when 33% had some form of hearing impairment; patterns in the degree of hearing impairment were similar for both years.



Note: Data are reported only where consent was obtained.

Source: Appendix Table E4.4.

Figure 4.5: Degree of hearing impairment, children and young people who received outreach audiology services, 2012–13 to 2014–15

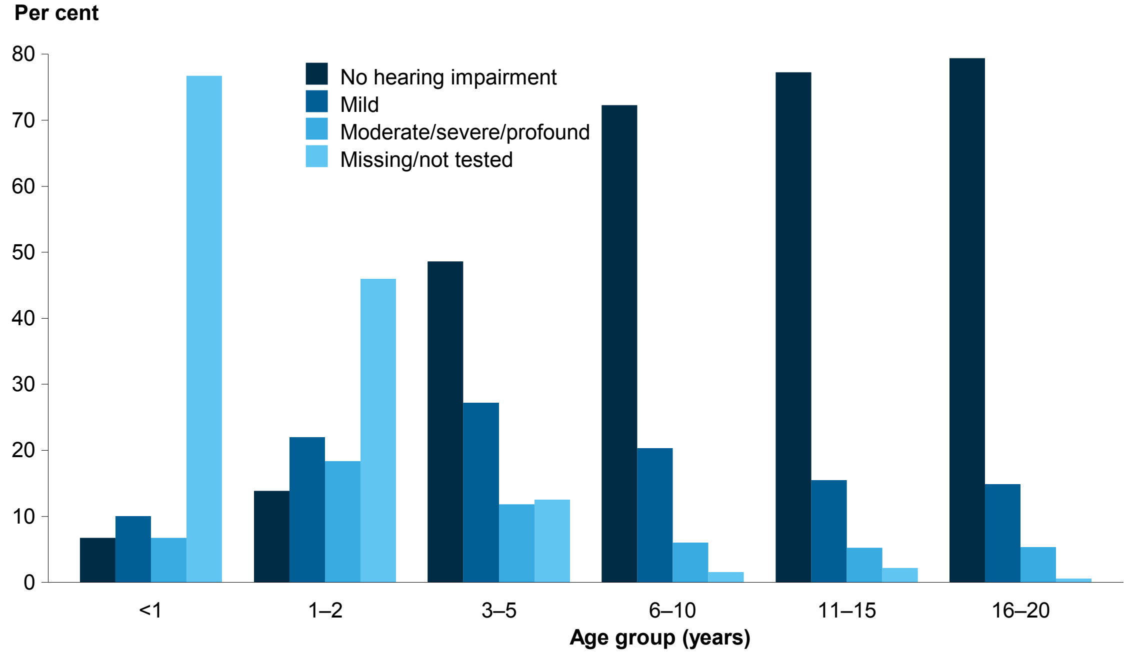
There was wide variation in degrees of hearing impairment between age groups, which tended to be more severe in younger age groups.

As shown in Figure 4.6 (and Appendix Table E4.5), in 2014–15:

- 7% of children aged less than 1 had moderate, severe or profound hearing impairment, and 10% had mild hearing impairment
- 18% of children aged 1–2 had moderate, severe or profound hearing impairment, and 22% had mild hearing impairment
- 12% of children aged 3–5 had moderate, severe or profound hearing impairment, and 27% had mild hearing impairment
- 6% of children aged 6–10 had moderate, severe or profound hearing impairment, and 20% had mild hearing impairment
- 5% of children and young people aged 11–15 had moderate, severe or profound hearing impairment, and 15% had mild hearing impairment
- 5% of young people aged 16–20 had moderate, severe or profound hearing impairment and 15% had mild hearing impairment.

The largest decreases between 2012–13 and 2014–15 in the proportion of children and young people who had moderate, severe or profound hearing impairment was among those aged 16–20 (16% to 5%) and 1–2 (21% to 18%) (Table E4.5).

Note that there were high proportions of children aged under 1 and 1–2 with missing or not-tested hearing impairment in 2014–15 (77% and 46%, respectively) as it is difficult to test hearing loss and impairment among children in these age groups.



Note: Data are reported only where consent was obtained.

Source: Appendix Table E4.5.

Figure 4.6: Degree of hearing impairment by age, children and young people who received outreach audiology services, 2014–15

Further actions recommended

During audiology consultations, audiologists recommend further action for the continued care of service recipients.

In 2014–15, of the 2,400 children and young people who received audiology services:

- 61% required further action
- the most common actions recommended were ongoing monitoring by a Northern Territory hearing health service (56%), case management by a primary health care centre (15%), and case management by an ENT specialist (13%)
- the majority of service recipients who were recommended for further action had hearing loss, with 97% of children and young people with hearing loss recommended for at least 1 further action. A small proportion of service recipients who previously had hearing loss but were not diagnosed with hearing loss at their latest check required further monitoring or other actions (Appendix Table E4.6).

Between 2013–14 and 2014–15:

- the proportion of children and young people recommended for at least 1 further action decreased from 69% to 61%
- there were decreases in the proportions of service recipients who were recommended for case management by an ENT specialist (from 17% to 13%) and for ongoing management by Northern Territory Hearing services (59% to 56%)
- there was an increase in the proportion of service recipients recommended for a referral to Australian Hearing (from 8% to 12%).

4.4 Changes in hearing loss and impairment

The following sections present information about the changes in hearing loss and impairment experienced by children and young people on the treatment pathway in the hearing health program—that is, for those who received more than 1 audiology service. These analyses allow an understanding of the effectiveness of hearing health outreach services in improving outcomes over time. With appropriate and timely treatment, it may be possible for a child or young person's hearing health to improve, through reductions in hearing loss (for example, from bilateral to unilateral hearing loss) and reductions in the severity of hearing impairment experienced (for example, from moderate to mild).

The changes in hearing loss and impairment are measured both by short-term and long-term trends, which are summarised in Table 4.4. Short-term trend analyses cover 3 financial years from July 2012 to June 2015 and examine changes over time for the SFNT program. The table includes the participants who received 2 or more services (with a minimum interval between services of 3 months) and compares their hearing assessment results cross-sectionally (see Box 4.3 for a definition of cross-sectional analysis).

The long-term trend analyses cover 8 years from August 2007 to June 2015 and examine changes that occurred since the beginning of the audiology program funded by the Australian Government, initially through CHCI(CtG). It includes participants who received 3 or more services, and compares their hearing assessment results cross-sectionally between their first, second last and last services. In addition, cohort analyses were undertaken to track the progress of individual service recipients over the period. Using this method, it is possible to assess the proportion of children and young people whose hearing health improved, deteriorated, stabilised and fluctuated over time (see Box 4.3).

Table 4.4: Summary of scope and methods for trend analyses (short and long term) for change in hearing loss and impairment among audiology service recipients

		Scope		Type of analysis	
Trend analysis	Period	Program	Number of services received by child	Cross-sectional	Cohort
Short term	3 years (July 2012–June 2015)	SFNT, HEBHBL	2 or more	✓	—
Long term	8 years (August 2007–June 2015)	CHCI(CtG), SFNT, HEBHBL	3 or more	✓	✓

Note: HEBHBL is the program Healthy Ears—Better Hearing, Better Listening programme.

Children and young people who received at least 2 services

Changes in hearing loss

There were improvements in hearing over time among the 1,237 children and young people who received 2 or more hearing health outreach audiology services between July 2012 and June 2015. The data analysed in this section are cross-sectional (see Box 4.3). Between first and last service there was a 26% decrease in the proportion with hearing loss (from 80% at the first service to 59% at the last service):

- The proportion with bilateral hearing loss decreased by 28%, from 54% at the first service to 39% at the last service.
- The proportion with unilateral hearing loss decreased by 21%, from 26% at first service to 20% at last service (Table E4.7; Figure 4.7).

Box 4.3: Definitions of cross-sectional and cohort analyses

Cross-sectional analysis

Cross-sectional analysis is the analysis of data collected from a population, or a subset, at one specific point in time. In this report, cross-sectional analyses were undertaken to compare the hearing health of children and young people who received multiple services between this group's first and last audiology checks. Among those who received multiple services, the proportion of service recipients with hearing loss or impairment at their first service is compared with the proportion with hearing loss or impairment at their last service.

Cohort analysis

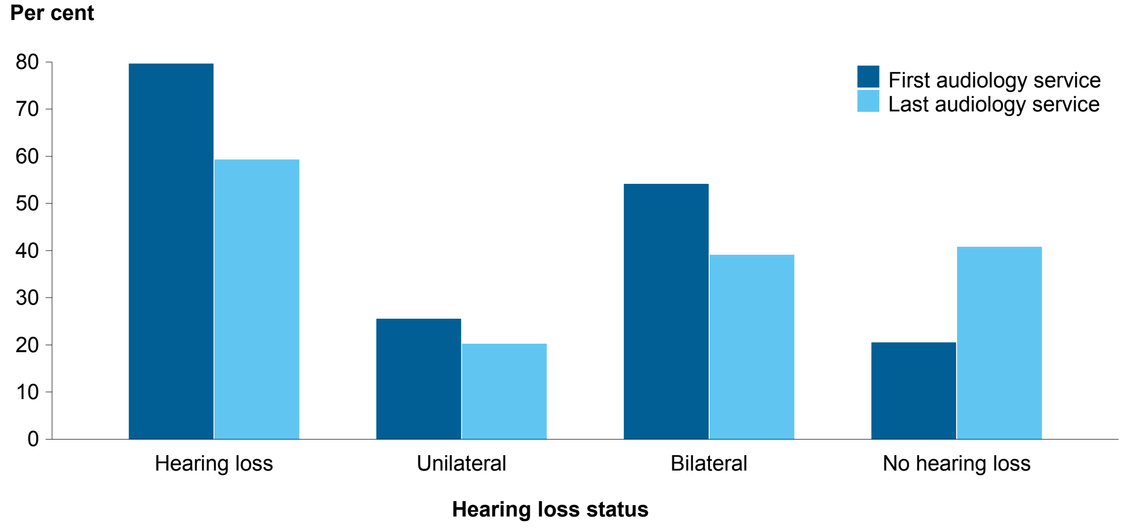
Cohort analysis is the analysis of a data for a population, or a subset, over time. It allows the progress of individual service recipients to be tracked over the period analysed. In this report, individual service recipients who received 3 or more services were tracked to determine whether their hearing loss and hearing impairment improved, deteriorated, fluctuated or stabilised.

Categories for changes in hearing loss and degree of hearing impairment

- *Improved hearing loss and impairment:* Hearing loss and impairment were classified as 'improved' if a child or young person's hearing loss status or degree of hearing impairment improved between first and second services and the second and third services, or if there was an improvement between 2 services and no change between the other 2 services.
  - *Improved hearing loss* was defined as a change in hearing loss status between audiology services in the following scenarios: (1) From bilateral hearing loss to unilateral hearing loss or no hearing loss; (2) From unilateral hearing loss to no hearing loss.
  - *Improved hearing impairment* was defined as a movement between audiology services to a lower degree of hearing impairment (for example, from profound hearing impairment to severe, moderate or mild hearing impairment).
- *Deteriorated hearing loss and impairment:* Hearing loss status and degree of hearing impairment were classified as 'deteriorated' if a child or young person's hearing loss status or degree of hearing impairment deteriorated between services (the first and second services and the second and third services), or if there was a deterioration between only 2 services and no change between the other 2 services.
  - *Deteriorated hearing loss status* was defined as a change between audiology services in the following scenarios: (1) From no hearing loss to unilateral or bilateral hearing loss; (2) From unilateral hearing loss to bilateral hearing loss.
  - *Deteriorated hearing impairment* was defined as a movement between audiology services to a higher degree of hearing impairment (for example, from mild hearing impairment to moderate, severe or profound hearing impairment).
- *Stabilised hearing loss and impairment:* Hearing loss and impairment were classified as 'stabilised' if a service recipient's hearing loss status or degree of hearing impairment was the same in all 3 audiology services included for analysis in this study.
- *Fluctuated hearing loss and impairment:* Hearing loss and impairment were classified as 'fluctuating' if a child or young person's hearing loss status or degree of hearing impairment differed between services included for analysis in this study without a clear pattern in either improvement or deterioration (that is, if hearing loss status or degree of hearing impairment improved between first and second services and deteriorated between second and third services, or vice versa).

Another way to assess changes in hearing loss status is to look at the proportion of children and young people with unilateral, bilateral and no hearing loss at their last service, disaggregated by hearing loss status at their first service. Table 4.5 shows that, overall, among those who had 2 or more outreach audiology services between July 2012 and June 2015, there were some improvements for children and young people who had hearing loss at their first service:

- Of the 669 children and young people who had bilateral hearing loss at their first service, 29% had no hearing loss at their last service and 16% had unilateral hearing loss, while 55% still had bilateral hearing loss.
- Of the 315 children and young people who had unilateral hearing loss at their first service, 41% had no hearing loss at their last service, 36% still had unilateral hearing loss, and 23% developed bilateral hearing loss.
- Of the 253 children and young people who had no hearing loss at their first service, 71% still had no hearing loss at their last service, 12% had unilateral hearing loss, and 17% had bilateral hearing loss.
- There were 984 children and young people with hearing loss at their first service (315 with unilateral hearing loss and 669 with bilateral hearing loss). Hearing loss status improved for 44% of these children and young people. This comprised:
  - 324 children and young people (or 33%) who, at their last outreach audiology service, had recovered from hearing loss. Of these, 129 had unilateral hearing loss and 195 had bilateral hearing loss at their first outreach audiology service
  - 107 children and young people (or 11%) who improved from bilateral to unilateral hearing loss.



Notes

1. Data are reported only where consent was obtained.
2. ‘Hearing loss’ category includes total children and young people with unilateral and bilateral hearing loss.
3. Median time between first and second service: 9 months. Minimum time interval: 3 months.

Source: Appendix Table E4.7.

Figure 4.7: Change in hearing loss status among children and young people who received at least 2 outreach audiology services between July 2012 and June 2015

Table 4.5: Change in hearing status, children and young people who received at least 2 outreach audiology services, 2012–15[(a)(b)]

	Hearing loss status at last service							
	No hearing loss		Unilateral		Bilateral		Total[(c)]	
Hearing loss status at first service	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
No hearing loss	180	71.1	30	11.9	43	17.0	253	100.0
Unilateral	129	41.0	113	35.9	73	23.2	315	100.0
Bilateral	195	29.1	107	16.0	367	54.9	669	100.0
Total[(d)]	**504**	**40.7**	**250**	**20.2**	**483**	**39.0**	**1,237**	**100.0**

(a) Minimum time interval between first and last service: 3 months.

(b) Includes children and young people who received 2 or more outreach audiology services. Excludes children with missing or not tested responses for hearing loss status.

(c) Refers to the total number of children and young people at their first service.

(d) Refers to the total number of children and young people at their last service

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Changes in hearing impairment

Among children and young people who received 2 or more outreach audiology services, 626 had some degree of hearing impairment at their first check (Table 4.6). Of these service recipients, between their first and last service:

- more than half (56%) had an improvement in their degree of hearing impairment (that is, a movement to a less severe hearing impairment category)
- 37% had no change in their degree of hearing impairment
- 6% experienced deteriorated hearing impairment (that is, a movement to a more severe hearing impairment category).

The magnitude and sustained nature of improvements to hearing impairment suggest the overall effectiveness of the program in enhancing hearing health. This is particularly the case given that audiology and ENT outreach services now target the highest-priority cases first.

Factors contributing to the observed improvements in hearing health include:

- the effectiveness of medical interventions provided at audiology services
- 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.

Table 4.6: Change in degree of hearing impairment, children and young people who received at least 2 outreach audiology services, 2012–15(a)(b)

Change in hearing impairment	Number	Per cent
Improved(c)	353	56.4
No change	234	37.4
Deteriorated(d)	39	6.2
Total service recipients	**626**	**100.0**

(a) Median interval between first and last service: 15 months. Minimum time interval: 3 months.

(b) Indigenous children and young people who had 2 or more audiology services and had some degree of hearing impairment at their first service. Excludes service recipients with missing or not tested responses for hearing impairment.

(c) Defined as a movement to a less severe hearing impairment category, for example, from moderate to mild.

(d) Defined as a movement to a more severe hearing impairment category, for example, from mild to moderate.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Children and young people who received at least 3 services

This section analyses changes in hearing loss and impairment among children and young people who received at least 3 audiology services over the course of the CHCI(CtG) and SFNT programs—that is, from August 2007 to June 2015. Analyses of services from CHCI(CtG) have been included here to assess long-term hearing health outcomes since the start of CHCI(CtG).

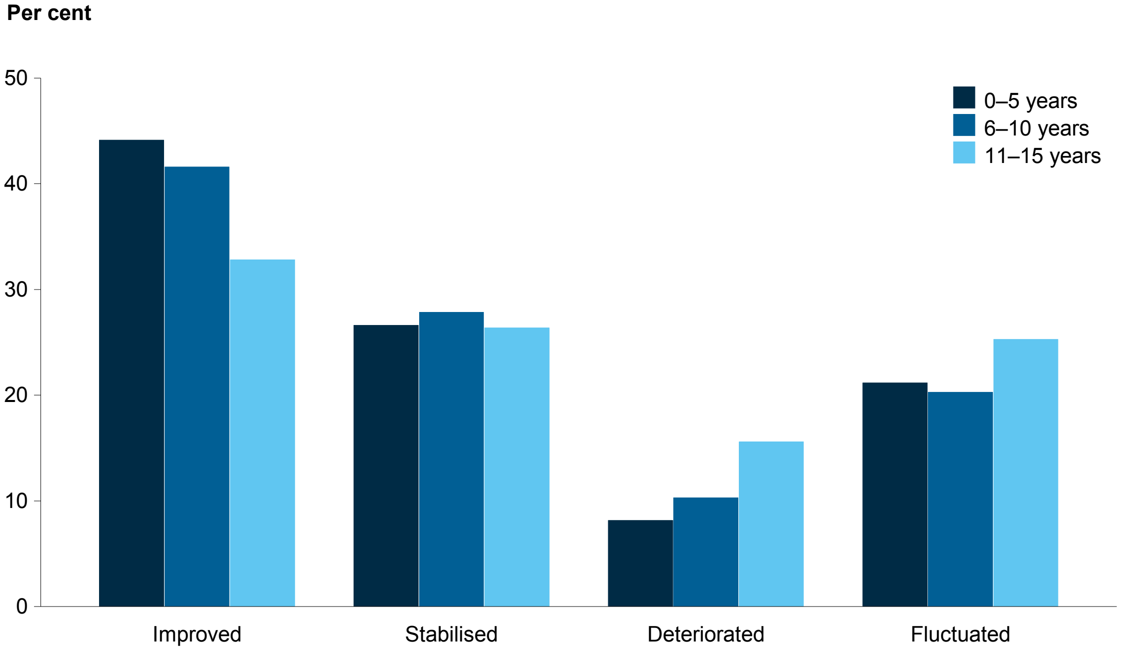
The data in this section are based on age at first service, with ages 0–5, 6–10 and 11–15 years analysed. These age ranges were chosen to separately analyse the profiles of service recipients based on the age at which they first received outreach audiology services, as they often differ in hearing conditions, treatment pathways and outcomes in hearing health status. For example, children and young people who first receive services at older ages could have had chronic middle ear conditions for a longer time and therefore have more irreversible damage to their hearing. On the other hand, those who first received outreach audiology services at younger ages (0–5) might be more likely to experience improvements to hearing health due to early intervention and treatment.

Changes in hearing loss

The analyses in this section show changes in hearing loss status for children and young people who received at least 3 hearing health outreach audiology services between August 2007 and June 2015 (excluding those with missing or not tested hearing loss status). Hearing loss status was measured at the first service, second last service and last service. The minimum time interval between services was 3 months, to allow analysis of long-term outcomes.

Figure 4.8 presents results of a cohort study, in which each child or young person was followed up individually and their hearing loss status compared at the first service, second last service and last service. There were 1,430 people aged 0–15 included in this analysis; 662 (46%) aged 0–5, 582 aged 6–10 (41%), and 186 (13%) aged 11–15. There were similar patterns in changes in hearing loss status between the 3 age groups, but those who entered the services at younger ages (0–5) had slightly better outcomes. A higher proportion in the younger age groups had their hearing loss status improve (44% of 0–5-year olds and 42% of 6–10-year olds) than the older age group (33% of 11–15-year olds) (Figure 4.8).

- Among children aged 0–5, hearing loss improved for 44%, stabilised for 27%, fluctuated for 21% and deteriorated for 8% (see Box 4.3 for definitions of categories).
- Among children and young people aged 6–10, hearing loss improved for 42%, stabilised for 28%, fluctuated for 20% and deteriorated for 10%.
- Among children and young people aged 11–15, hearing loss improved for 33%, stabilised for 26%, fluctuated for 25% and deteriorated for 16% (Figure 4.8; Table E4.8).



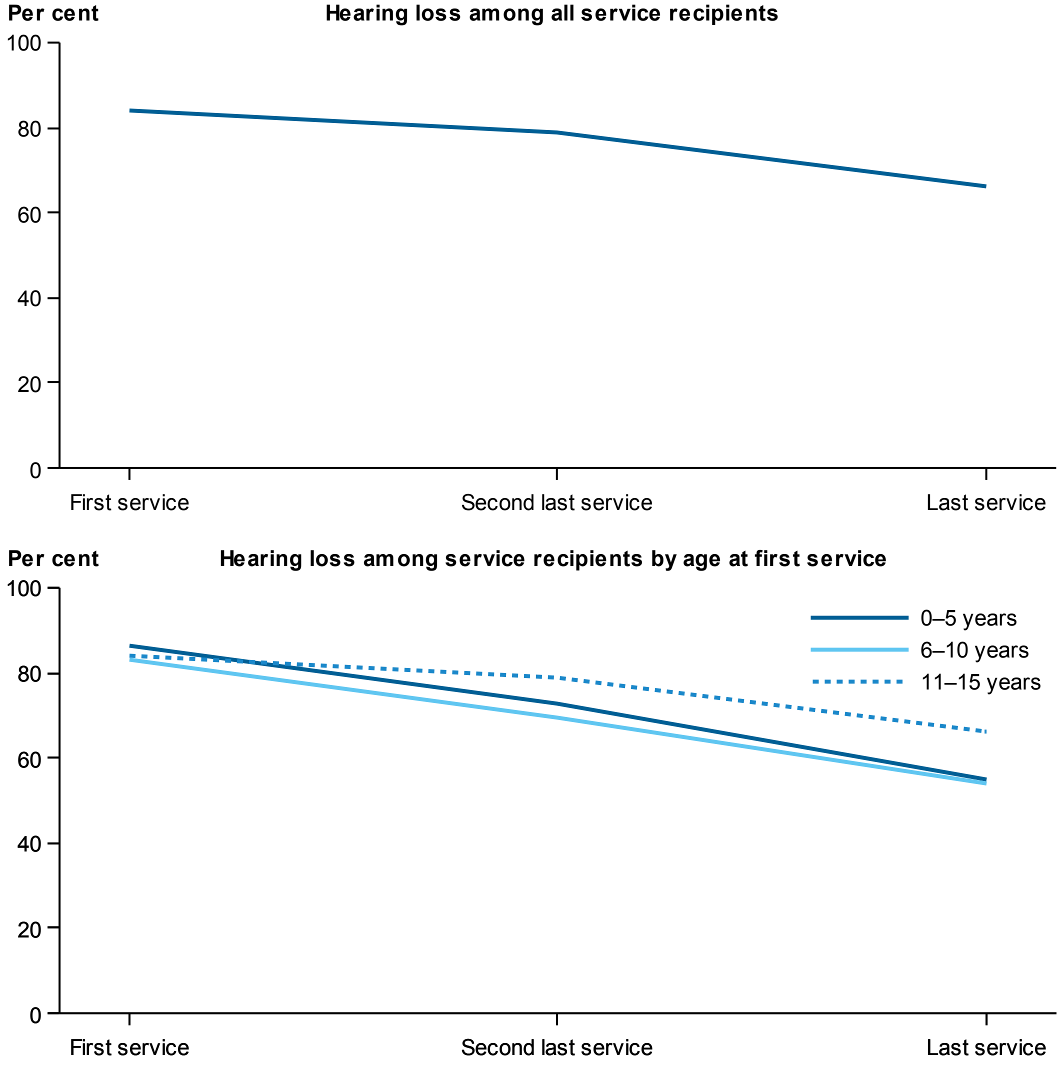
Note: Data are reported only where consent was obtained.

Source: Appendix Table E4.8.

Figure 4.8: Changes in hearing loss status among children and young people who received 3 or more audiology services (cohort study), by age at first service, August 2007 to June 2015

Figure 4.9 shows hearing loss status cross sectionally by age groups among service recipients from August 2007 to June 2015. From a total of 1,430 children and young people aged 0–15 who received 3 or more services:

- 85% had hearing loss at their first outreach audiology service, which decreased to 72% at the second last service and 56% at the last service
- the proportions of children and young people with hearing loss were similar between age groups at first service (ranging from 83% to 86%) and there were improvements for all age groups over time. However, there was a larger decrease in the rate at second last and last services for age groups 0–5 and 6–10 compared with age group 11–15. At the last service, 55% of those aged 0–5 and 54% of those aged 6–10 had hearing loss, compared with 66% of 11–15 year olds (Figure 4.9; Table E4.9).



Notes

1. Excludes children and young people with missing or not tested responses for hearing loss status.
2. Minimum time between services: 3 months.
3. Data are reported for children and young people only where consent was obtained.

Source: Appendix Table E4.9.

Figure 4.9: Proportion of children and young people with hearing loss at first service, second last service and last service (among those who received 3 or more services), August 2007 to June 2015

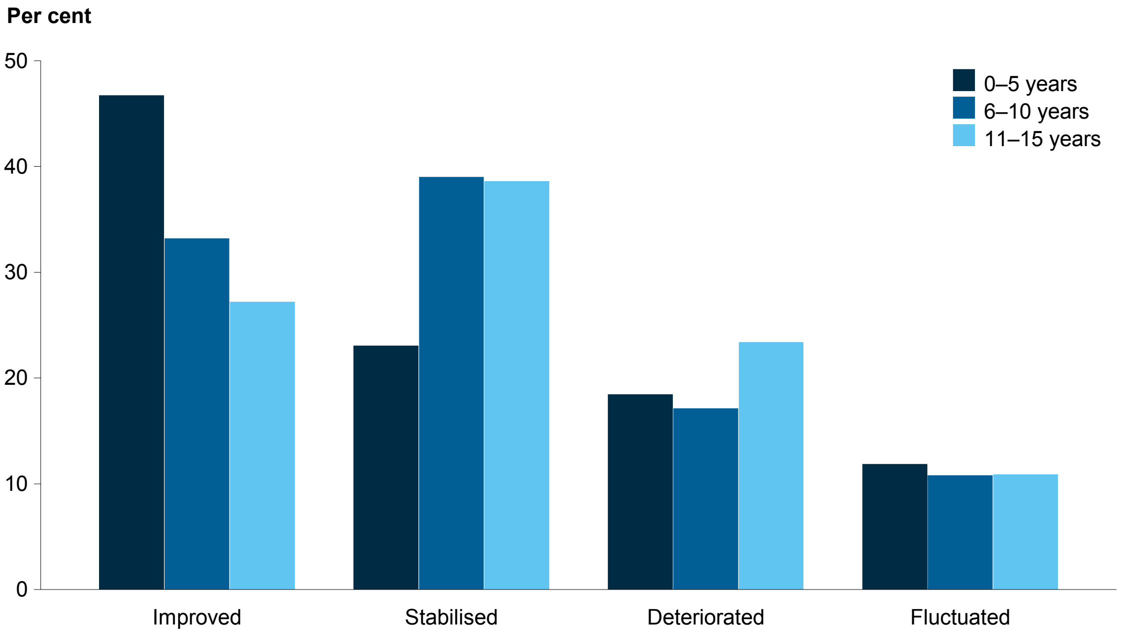
Changes in hearing impairment

The analyses in this section show changes in hearing impairment among 1,420 children and young people who received 3 or more outreach audiology services between August 2007 and June 2015 (excluding those with missing or not tested hearing impairment).

Figure 4.10 presents results of a cohort study in which each child was followed up individually, with their degree of hearing impairment between services over the period compared. Children who entered the services when they were younger had better outcomes in hearing impairment; this is consistent with the outcomes of the cohort analysis for hearing loss status.

Between August 2007 and June 2015:

- among children who entered the services when they were aged 0–5, 47% had improved hearing impairment status, 23% were stable, 18% deteriorated and 12% fluctuated in their degree of hearing impairment (see Box 4.3 for definitions of categories)
- among children and young people who entered services aged 6–10, 33% improved, 39% were stable, 17% deteriorated and 11% fluctuated in their degree of hearing impairment
- among children and young people who entered services aged 11–15, 27% improved, 39% were stable, 23% deteriorated and 11% fluctuated in their degree of hearing impairment (Table E4.10; Figure 4.10).



Note: Data are reported only where consent was obtained.

Source: Appendix Table E4.10.

Figure 4.10: Changes in hearing impairment among children and young people who received 3 or more audiology services (cohort study), by age at first service, August 2007 to June 2015

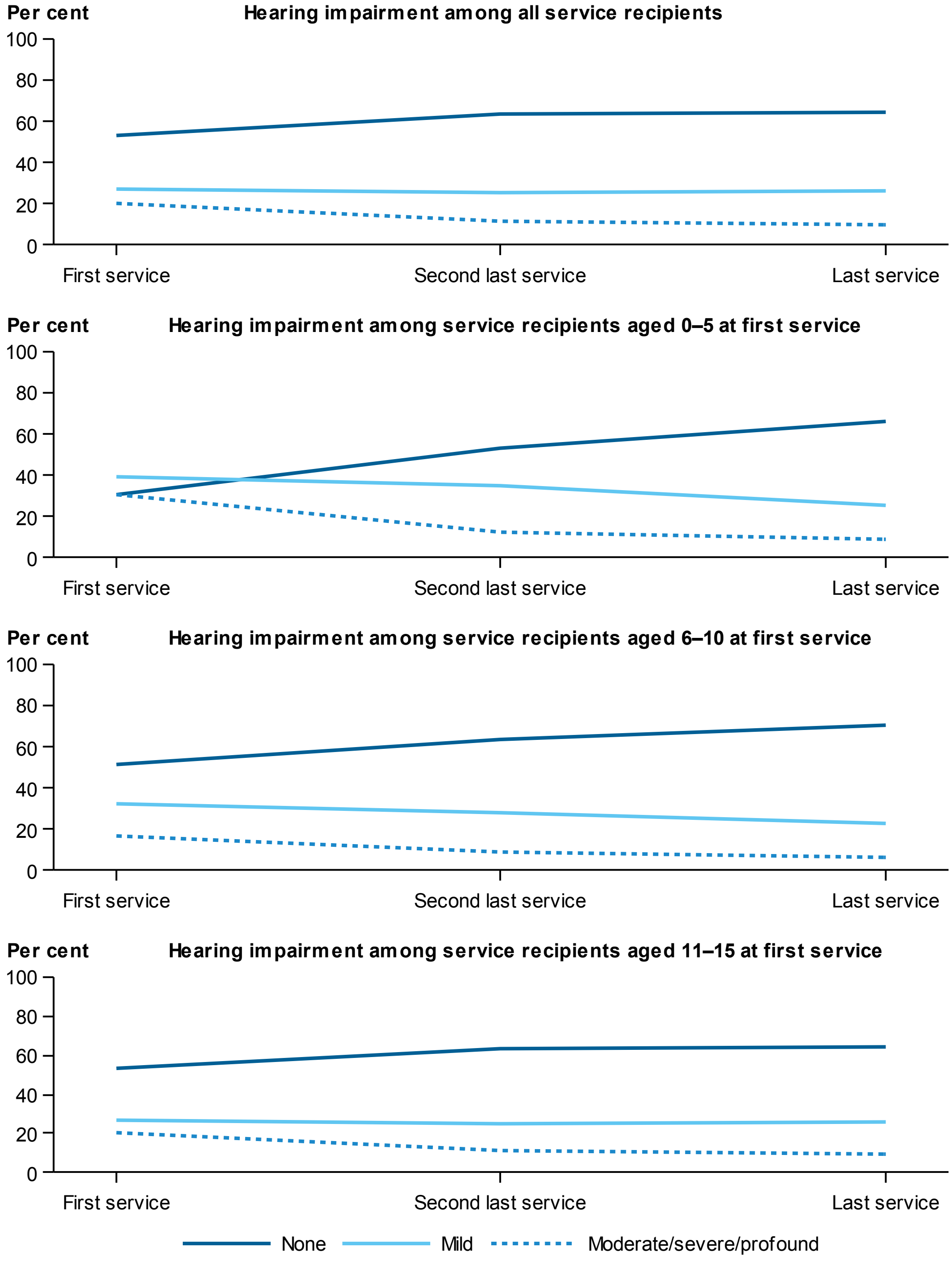
Figure 4.11 shows cross-sectional changes in hearing impairment among children and young people who received 3 or more outreach audiology services between August 2007 and June 2015. Out of 1,420 children and young people aged 0–15, the proportion with hearing impairment decreased between first and last services:

- At the first service, 35% had mild hearing impairment, which decreased to 31% at the second last service, and to 25% at the last service.
- There was an even greater decrease in the proportion with moderate, severe or profound hearing impairment, reducing from 24% at the first service to 11% at the second last service and 8% at the last service.
- There was an increase in the proportion with no hearing impairment, from 42% at the first service to 68% at the last service (Table E4.11).

For both younger and older age groups, there were decreases in the proportion with hearing impairment (Figure 4.11). However, the patterns were more pronounced among younger service recipients.

- For the younger age group (0–5), there were relatively large decreases in hearing impairment by type. This is important progress because, for this age group in particular, improvements to hearing are associated with large functional gains in learning and language acquisition throughout childhood. The results show:
  - an overall decrease of 14 percentage points in the proportion with mild hearing impairment—from 39% at the first service to 35% at the second last service and to 25% at the last service
  - a decrease of 22 percentage points in the moderate, severe or profound hearing impairment category—from 31% at the first service to 9% at the last service.
- For age group 6–10, between the first and last service:
  - the proportion with mild hearing impairment decreased by 9 percentage points (from 32% to 23%)
  - the proportion with moderate, severe or profound hearing impairment decreased by 11 percentage points (from 17% to 6%).
- For age group 11–15, between the first and last service:
  - the proportion with mild hearing impairment remained at 26%
  - the proportion with moderate, severe or profound hearing impairment decreased by 10 percentage points (from 20% to 10%) (Table E4.11; Figure 4.11).

It is not entirely clear why there are differences between age groups in the reduction of hearing impairment between the first and last services. It could be associated with differences in the types of otitis media among children and young people in different age groups (see Table E7.2). Those in younger age groups are more likely to have acute otitis media (AOM) and less likely to have permanent damage to their hearing; therefore, they are more likely to be able to reverse hearing loss and impairment. By contrast, those in older age groups are more likely to have chronic otitis media. Damage to the middle ear structures associated with chronic otitis media such as tympanic membrane perforation, erosion of ossicles (middle ear bones), cohesion of ossicles or ossicular discontinuity increase risk of residual permanent hearing loss. This finding supports the targeting of services towards children aged under 5.



Notes

1. Excludes those with missing or not tested responses for hearing impairment status.
2. Minimum time between services: 3 months.
3. Data are reported for children and young people only where consent was obtained.

Source: Appendix Table E4.11.

Figure 4.11: Degree of hearing impairment at first hearing health service, second last service and last service (among children and young people who received 3 or more services), August 2007 to June 2015

4.5 Demand for audiology services

Almost 7,000 audiology outreach services were provided between July 2012 and June 2015, with a high demand for these services in remote communities in the Northern Territory. As at 30 June 2015, 2,719 children and young people were on the audiology referral list and were waiting to be seen (Table 4.7). It should be noted that these data, and those for teotology audiology services in Table 4.8 below, are not for outstanding referrals only. For example, the children and young people on the waiting list includes those who received services just before 30 June 2015 and need to be seen again for a follow-up appointment at some time in the future—their appointment is not yet overdue. The proportion of outstanding (or overdue) referrals on the waiting list is unknown.

Table 4.7 shows the number of people aged 20 and under who received audiology referrals and were on the waiting list in remote Northern Territory communities as at 30 June 2015:

- The majority of referrals (93%) were made for children and young people aged 0–15.
- Almost 200 referrals (7%) were made for young people aged 16–20.

Table 4.7: Number and proportion of children and young people on referral waiting list for outreach audiology services, by Health Service Delivery Area and age group, as at 30 June 2015

Health Service Delivery Area	0–15 years		16–20 years		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Barkly	194	97.5	5	2.5	199	100.0
Central Australia	615	95.2	31	4.8	646	100.0
East Arnhem	467	95.3	23	4.7	490	100.0
Katherine	552	86.3	88	13.8	640	100.0
Top End	684	93.8	45	6.2	729	100.0
Interstate	13	100.0	—	—	13	100.0
Unknown	2	100.0	—	—	2	100.0
Total	**2,527**	**92.9**	**192**	**7.1**	**2,719**	**100.0**

Source: NT DoH, unpublished data.

Audiology services are also available to children and young people in the Northern Territory through teleotology outreach visits (see Chapter 5). Table 4.8 shows the number of children and young people on the referral waiting list for audiology services provided through teleotology outreach visits. As at 30 June 2015, for teleotology audiology services:

- 2,110 children and young people aged 20 and under were on the referral waiting list for teleotology audiology services
- 90% of referrals were made for children and young people aged 0–15, and 10% were for young people aged 16–20.

Table 4.8: Number and proportion of children and young people on referral waiting list for teleotology audiology services, by Health Service Delivery Area and age group, as at 30 June 2015

Health Service Delivery Area	0–15 years		16–20 years		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Barkly	150	92.6	12	7.4	162	100.0
Central Australia	533	91.7	48	8.3	581	100.0
East Arnhem	370	90.2	40	9.8	410	100.0
Katherine	349	89.9	39	10.1	388	100.0
Top End	500	89.0	62	11.0	562	100.0
Interstate	6	100.0	—	—	6	100.0
Unknown	—	—	1	100.0	1	100.0
Total	**1,908**	**90.4**	**202**	**9.6**	**2,110**	**100.0**

Source: NT DoH, unpublished data.

From January 2013, children and young people on the referral waiting list were classified according to a service priority system, in which top priority children and young people received services first. The categories are listed in order of priority in Table 4.9. As the demand for audiology services is greater than current service capability, priority listing enables limited resources to be provided to those most in need.

The change in the process used to select who receives services first has affected the data analysed in this report: those with worse ear and hearing health are more likely to be captured in the data collection (relative to those with better ear and hearing health) than was the case before this priority listing system was implemented.

Table 4.9: Priority categories for children and young people with audiology referral in the Northern Territory

Priority	Category	Description
1	VROA[(a)]	Child aged under 4 requiring audiology assessment
2	Audio High	Children with a documented moderate or worse hearing impairment and requiring review, or a new referral from a primary health practitioner
3	Audio Medium	Children with mild hearing impairment, unilateral hearing loss,open ear disease or those with bilateral OME. Excludes children who are categorised as Audio High.
4	Audio Low	Audiology reviews others (should be minimal or no hearing loss, closed otitis media or eustachian tube dysfunction)

(a) See Box 4.1 for more information about VROA.

Source: NT DoH, unpublished data.

5 Ear, nose and throat teleotology services

Key findings

- Between July 2012 and June 2015, 2,737 ENT teleotology services were provided to 1,872 Indigenous children and young people in the Northern Territory. Most of these children and young people were in younger (under 11) than older age groups (11 and over).
- In 2014–15, 82% of children and young people who received ENT teleotology services were recommended for at least 1 type of action (treatment, surgery, further follow-up):
  - 24% of service recipients were recommended for at least 1 type of treatment
  - 30% were recommended for at least 1 type of surgery
  - 71% were recommended for at least 1 type of further follow-up.
- Between 2013–14 and 2014–15:
  - the proportion of children and young people recommended for at least 1 type of action decreased from 89% to 82%
  - the proportion recommended for some form of treatment decreased from 30% to 24% and the proportion recommended for further follow-up from 81% to 71%.

This chapter provides information about ENT specialist consultations provided remotely and electronically through a technology called 'teleotology'. Teleotology allows ENT specialists to diagnose ear conditions and recommend treatment based on electronic middle ear images and case history collected by audiologists and CNC ENTs who visit remote communities. A detailed description of teleotology services can be found in Chapter 2. Data on face-to-face ENT services are not included in this report.

This chapter reports on the number of services provided, the number of children and young people who received services, and the type of treatments and further actions recommended. For data on ear conditions diagnosed among ENT teleotology service recipients, see Chapter 7.

5.1 ENT teleotology data collection

ENT teleotology data items include:

- information about the child or young person (HRN, date of birth and sex)
- information about the service (community where the service was provided and date of service)
- middle ear diagnosis
- actions recommended and follow-up required
- type of surgery recommended.

Apart from aggregated information on the number of services, no information is provided to the AIHW if the service recipient's parent or guardian did not consent to share detailed information. Therefore, the detailed analyses in this chapter are based on consented data only.

5.2 ENT teleotology services

ENT teleotology services provided

In 2014–15, 937 ENT teleotology services were provided to 860 children and young people with an average of 1.1 services per child or young person for whom consent to share data with the AIHW was obtained (tables 5.1 and 5.2).

Overall, from July 2012 to June 2015, 2,737 ENT teleotology services were provided and 1,872 children and young people received services, with an average 1.5 services per child or young person (tables 5.1 and 5.2). Consent to share information with the AIHW was provided for almost all who received services.

A number of factors contribute to changes in the number of ENT teleotology services provided each year—for example, the availability of children and their families during outreach visits, logistical issues experienced by outreach teams with accessing communities (for example, inclement weather and road closures), access restrictions during community events such as ceremonies, deaths and major sports events.

Table 5.1: Number of ENT teleotology services and service recipients, by consent status, 2012–13 to 2014–15

	Services			Service recipients		
	Consent	Non-consent	Total	Consent	Non-consent	Total
			Number			
2012–13	820	4	824	723	4	727
2013–14	962	14	976	837	14	851
2014–15	931	6	937	854	6	860
Cumulative total	**2,713**	**24**	**2,737**	**1,848**(a)	**24**	**1,872**(a)
			Per cent			
2012–13	99.5	0.5	100.0	99.4	0.5	100.0
2013–14	98.6	1.4	100.0	98.4	1.4	100.0
2014–15	99.4	0.6	100.0	99.3	0.6	100.0
Cumulative total	**99.1**	**0.9**	**100.0**	**98.6**	**0.9**	**100.0**

(a) The total number of service recipients in 2012–13, 2013–14 and 2014–15 combined does not sum to the rows because some children and young people received services in multiple financial years; these service recipients were counted only once in the total.

Note: Services include only those provided through the ENT program.

Source: AIHW analysis of ENT teleotology data collection (services provided on or before 30 June 2015).

ENT services are available to children and young people aged 21 and under, but analyses in this report include ages 0–20 only because data on people aged 21 are not contained in the ENT teleotology data collection.

In 2014–15:

- 38% of service recipients were aged 6–10, 26% aged 0–5, 25% aged 11–15, and 11% aged 16–20. Age group distributions were similar between financial years from 2012–13 to 2014–15 (Figure 5.1)
- there was a slightly higher proportion of service recipients who were female than male (52% and 48%, respectively). This was also observed in 2012–13 and 2013–14 (Appendix Table E5.1).

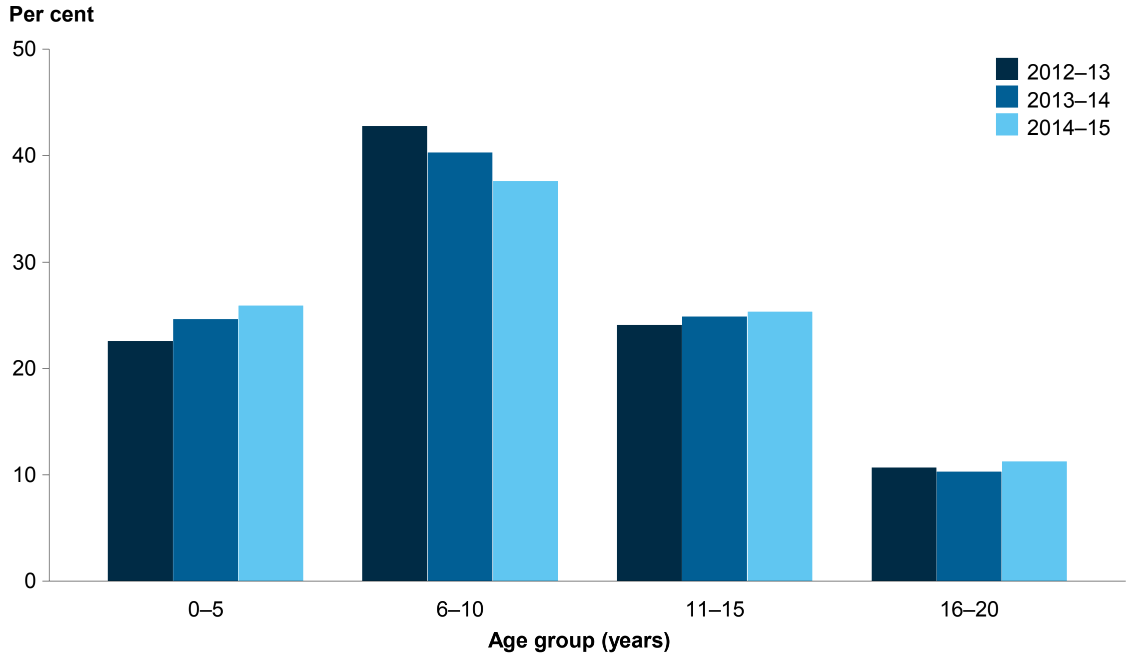
Table 5.2: Average and maximum number of teleotology services received, and proportion of children and young people who received 1 service, 2012–13 to 2014–15

	2012–13	2013–14	2014–15	Cumulative total (2012–15)[(a)]
Average number of services per child or young person	1.1	1.1	1.1	**1.5**
Maximum number of services	3	4	3	**6**
% of children and young people who received 1 service	87.7	86.1	91.2	**69.4**

(a) Cumulative total includes data on people who received ENT teleotology services from 1 July 2012 to 30 June 2015. It does not equal the sum of the financial years, For example, the maximum number of services is that for 2012–15, not the sum of the maximum number of services from 2012–13 to 2014–15 combined.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of ENT teleotology data collection (services provided on or before 30 June 2015).



Note: Data are reported only where consent was obtained.

Source: Appendix Table E5.1.

Figure 5.1: Children and young people who received an ENT teleotology service, by age, 2012–13 to 2014–15

Clinical management during ENT teleotology services

There are 3 categories of actions that are recommended by ENT specialists: treatment, surgery, and further-follow-up. In 2014–15, 82% of children and young people who received ENT teleotology services were recommended for at least 1 type of action:

- 24% were recommended for at least 1 type of treatment
- 30% were recommended for at least 1 type of surgery
- 71% were recommended for at least 1 type of further follow-up.

Note that children can be recommended for more than 1 type of action. The following sections provide more detailed information on each of these action types.

Treatment recommended

As part of ENT teleotology services, ENT specialists recommend treatment to be implemented by the child's primary health care provider. Among the 854 children and young people who received ENT teleotology services in 2014–15:

- 24% were recommended for some form of treatment
- the most common type of treatment was medication, recommended for 23% of children and young people (Figure 5.2; Table E5.2).

Between 2013–14 and 2014–15, there was a decrease in the proportion of children and young people recommended for some form of treatment (from 30% to 24%).

Surgery recommended

In 2014–15, 30% of children and young people who received ENT services were recommended for at least 1 type of surgery, most commonly myringoplasty (21%), followed by adenoidectomy and grommets (5% each) (Figure 5.2; Table E5.2) (see Box 5.1 for explanations of surgery types). Patterns in surgery recommendations were similar for 2012–13 to 2014–15.

Further follow-up recommended

The majority of children and young people who received an ENT teleotology service were recommended for further follow-up.

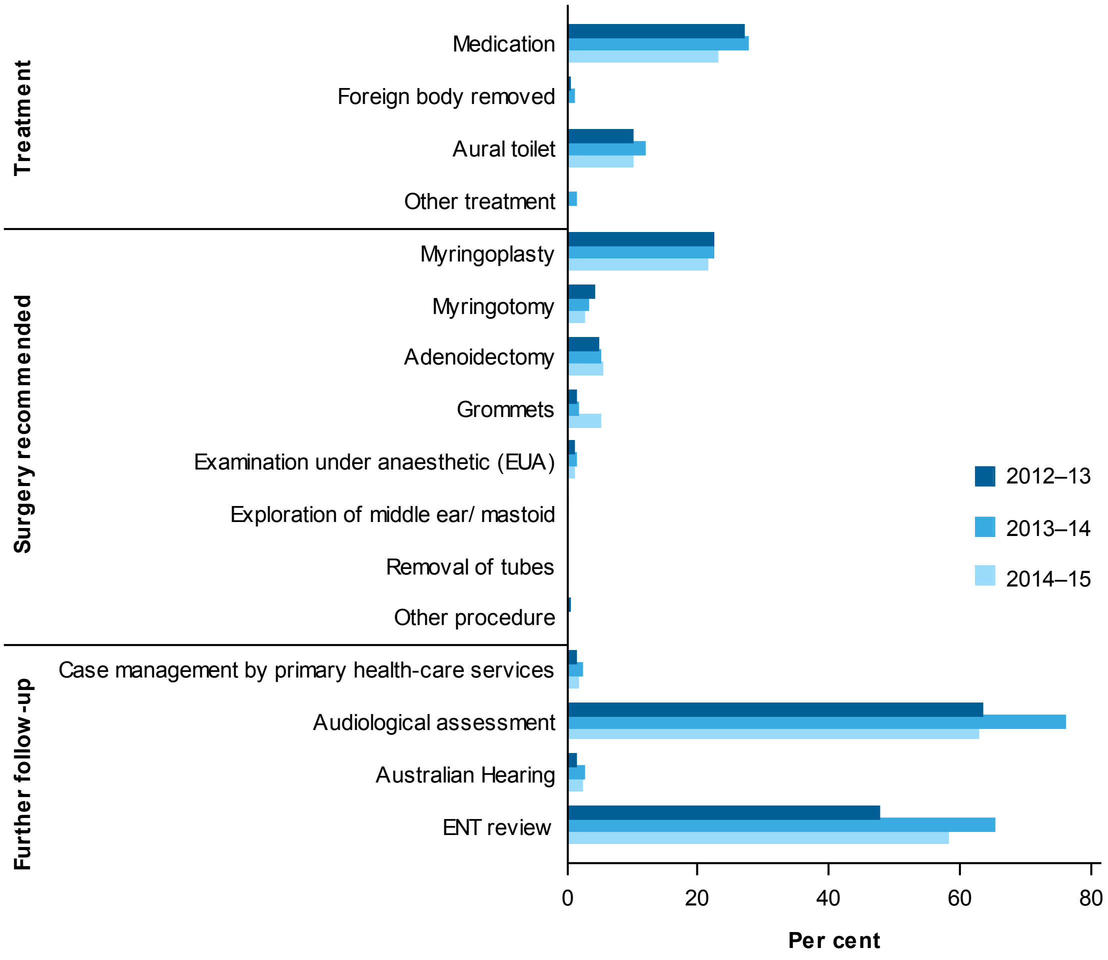
In 2014–15:

- 603 children and young people (71%) were recommended for at least 1 further type of follow-up
- 63% were recommended for an audiological assessment, 58% for an ENT review, 2% for referral to Australian Hearing, and 2% for case management by primary health-care services (Figure 5.2; Table E5.2).

Between 2013–14 and 2014–15:

- the proportion of children and young people recommended for further follow-up decreased from 81% to 71%
- the proportion of service recipients recommended for an audiological assessment decreased from 76% to 63%, and for an ENT review from 65% to 58%.

Decreases in the proportion of children and young people recommended for further follow-up may suggest the effectiveness of ENT teleotology services—with improved ear and hearing health among service recipients, there may be less need for follow-up appointments.



Note: Data are reported only where consent was obtained.

Source: Appendix Table E5.2.

Figure 5.2: Type of action recommended among children and young people who received an ENT teleotology service, 2012–13 to 2014–15

Box 5.1: Common types of surgery to manage ear disease

- *Myringotomy*: a procedure in which a tiny incision is created in the eardrum to relieve pressure caused by excessive build-up of fluid, or to remove fluid from the middle ear.
- *Myringoplasty*: the repair of a perforation of the tympanic membrane (ear drum).
- *Adenoidectomy*: the surgical removal of adenoids.
- *Grommet*: a tiny tube is surgically placed across the eardrum to re-establish ventilation to the middle ear. It is also called a 'ventilation tube', a 'pressure equalisation tube', or a 'tympanostomy tube'.
- *Examination under anaesthetic*: the examination of a child's ear(s) while under anaesthetic.

5.3 Demand for teleotology services

Teleotology services were implemented in the Northern Territory in 2009. They offer additional ENT consultations to complement those available through face-to-face services in urban areas and through the Specialist Outreach Northern Territory program. Teleotology services are most applicable for children and young people with routine otitis media conditions in geographically remote areas and for those who need post-surgery review.

Table 5.3 shows the number of people aged 20 and under on the ENT teleotology referral waiting list in remote communities of the Northern Territory. It should be noted that these data are not only for outstanding referrals. For example, the children and young people on the waiting list includes those who received services just before 30 June 2015 and need to be seen again for a follow-up appointment at some time in the future—their appointment is not yet overdue. However, the proportion of outstanding (or overdue) referrals on the waiting list is unknown.

It should also be noted that the data presented here are for teleotology referrals to *ENT specialists*, whereas data presented in Table 4.8 (see Chapter 4) are for teleotology referrals to *audiologists*.

As at 30 June 2015:

- most of the 2,885 children and young people who were on the waiting list for ENT teleotology services were aged under 15; only 10% were aged 16–20
- the services were most commonly required by people who lived in Top End (813 referrals) and Central Australia (798) (Table 5.3).

Table 5.3: Number of children and young people on referral waiting list for teleotology services, by Health Service Delivery Area and age group, as at 30 June 2015

Health Service Delivery Area	0–15 years		16–20 years		Total	
	Number	Per cent	Number	Per cent	Number	Per cent
Barkly	201	92.6	16	7.4	217	100.0
Central Australia	733	91.9	65	8.1	798	100.0
East Arnhem	459	89.5	54	10.5	513	100.0
Katherine	481	90.1	53	9.9	534	100.0
Top End	721	88.7	92	11.3	813	100.0
Interstate	9	100.0	—	—	9	100.0
Unknown	—	—	1	100.0	1	100.0
Total	**2,604**	**90.3**	**281**	**9.7**	**2,885**	**100.0**

Source: NT DoH, unpublished data.

From January 2013, children and young people on the referral waiting list were classified according to a service priority system, and they received services based on the category to which they were assigned. The categories are listed in order of priority in Table 5.4. As the demand for teleotology services is much greater than current service capability, priority listing enables children and young people most in need to receive services first. These prioritisation categories are continually monitored and adapted to ensure the best use of resources within the total hearing health system, and to avoid bottlenecks for any particular service input.

Table 5.4: Priority categories for children and young people requiring teleotology services in the Northern Territory

Priority	Category	Description
1	Post-surgical	Children and young people who require post-surgical follow-up review and monitoring
2	Teleotology High	Children and young people with 'unsafe' otitis media, and those previously assessed with moderate conductive hearing loss (bilateral) who have not received an ENT service for more than 6 months. 'Unsafe' otitis media is defined here as cholesteatoma or severe retraction (as diagnosed by an ENT specialist) or as otherwise determined by an ENT specialist Children and young people on the elective surgery waiting list who have not been seen for more than 6 months
3	Teleotology New	Children and young people requiring teleotology assessment in response to a new referral
4	Teleotology Routine	All other children requiring ENT review

Source: NT DoH, unpublished data.

6 Child Hearing Health Coordinator program

Key findings

- In 2014–15, CHHCs conducted 569 visits to 550 Indigenous children in the Northern Territory. From July 2012 to June 2015, CHHCs conducted 1,777 visits to 1,604 children.
- The most common type of service provided was ear health education, which was provided at almost all visits from 2012–13 to 2014–15.
- In 2014–15:
  - the most common types of service providers contacted by CHHCs were health providers (at 66% of CHHC visits), education providers (48%), and Australian Hearing (13%)
  - 88% of children who received CHHC services were diagnosed with at least 1 ear condition, which was similar to the proportion in 2013–14 (91%). The condition most often diagnosed was OME, with 42% of children having this condition at their first visit
  - among children who received both CHHC and audiology services, 74% had some form of hearing loss (mostly bilateral) and 56% had some form of hearing impairment.

This chapter provides information about CHHC services funded by the Australian Government, including the number of children visited by CHHCs, the types of services provided, contacts made by CHHCs with other service providers, and the ear and hearing health of children who received these services.

When interpreting the data analysed in this chapter, note that if children attended multiple visits, their demographic characteristics, priority listing and hearing health status were based on information at the first visit. Since admission into the program and the care pathway are based on priority categorisation (that is, age and health condition; see Box 6.1), it is appropriate to present the information based on the status of children upon entry into the program.

Box 6.1: CHHC hearing health priority categories

CHHC services are available to Indigenous children in the Northern Territory who have been assigned a hearing health priority category. The hearing health priority (HP) categories are:

- HP1: infants aged under 1 with recurrent acute otitis media or chronic suppurative otitis media with discharge; or infants who have failed newborn hearing screening
- HP2: children aged 1–2 with perforation of the eardrum (with or without discharge), recurrent acute otitis media, or persistent bilateral OME
- HP3: children aged 3–5 with perforation of the ear drum (with or without discharge), recurrent acute otitis media, persistent bilateral OME or moderate to profound hearing impairment
- HP4: children aged 6–10 with moderate, severe or profound hearing impairment.

6.1 CHHC data collection

CHHC data include:

- information about the child (HRN, date of birth and sex)
- information about the service (community where the service was provided and date of service)
- hearing health priority category
- ear health of children including diagnosis of middle ear condition
- clinical service activities provided to children
- contacts made with other service providers.

6.2 Children and visits

In 2014–15, CHHCs conducted 569 visits to 550 children (Table 6.1). Among those for whom consent was obtained, an average of 1 service per child was received (Table 6.2). From July 2012 to June 2015, CHHCs conducted 1,777 visits to 1,604 children, with an average of 1.2 services per child among those for whom consent was obtained (tables 6.1 and 6.2).

A number of factors contribute to changes in the number of CHHC visits provided each year—for example, the availability of children and their families, logistic issues experienced by teams with accessing communities (for example, inclement weather and road closures), and the recruitment of CHHCs. Additionally, the reduction in the number of children who received CHHC services between 2013–14 and 2014–15 (from 675 to 550) could be partially explained by issues with the recruitment of CHHCs for the program in 2014–15.

Rates of non-consent were high compared with those for other hearing health services included in this report. From July 2012 to June 2015, consent to share information was not provided for 52% of children who received visits (Table 6.1). This should be taken into account when interpreting the analyses presented in this chapter, as the data do not fully represent all children who received CHHC services. Non-consent rates have improved, decreasing from 62% in 2012–13 to 58% in 2013–14 and 25% in 2014–15.

The high rate of children for whom consent was not obtained can be partly explained by the personal nature of services conducted by the CHHCs. That is, CHHC services are provided in a personalised way that must be attuned to cultural sensitivities; this requires trust between clients and CHHCs. Coordinators often do not feel comfortable asking for consent to share information with a third party due to concerns about breaking the trust established with their clients. The hearing health team in NT DoH developed and implemented a training program to help improve consent rates, which could explain why non-consent rates decreased markedly in 2014–15.

Table 6.1: Number of children in the CHHC program and number of visits, by consent status, 2012–13 to 2014–15

	Services			Children		
	Consent	Non-consent	Total	Consent	Non-consent	Total
			Number			
2012–13	201	310	511	194	310	504
2013–14	308	389	697	286	389	675
2014–15	432	137	569	413	137	550
Cumulative total	**941**	**836**	**1,777**	**768**[(a)]	**836**	**1,604**[(a)]
			Per cent			
2012–13	39.3	60.7	100.0	38.5	61.5	100.0
2013–14	44.2	55.8	100.0	42.4	57.6	100.0
2014–15	75.9	24.1	100.0	75.1	24.9	100.0
Cumulative total	**53.0**	**47.0**	**100.0**	**47.9**	**52.1**	**100.0**

(a) The total number of children in 2012–13, 2013–14 and 2014–15 combined does not sum to the rows because some children received services in multiple financial years; these children were counted only once in the total.

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2015).

Table 6.2: Average and maximum number of CHHC services received, and proportion of children who received 1 service, 2012–13 to 2014–15

	2012–13	2013–14	2014–15	Cumulative total (2012–15)[(a)]
Average number of services per child	1.0	1.1	1.0	**1.2**
Maximum number of services	3	2	3	**3**
% of children who received 1 service	96.9	92.3	95.6	**80.7**

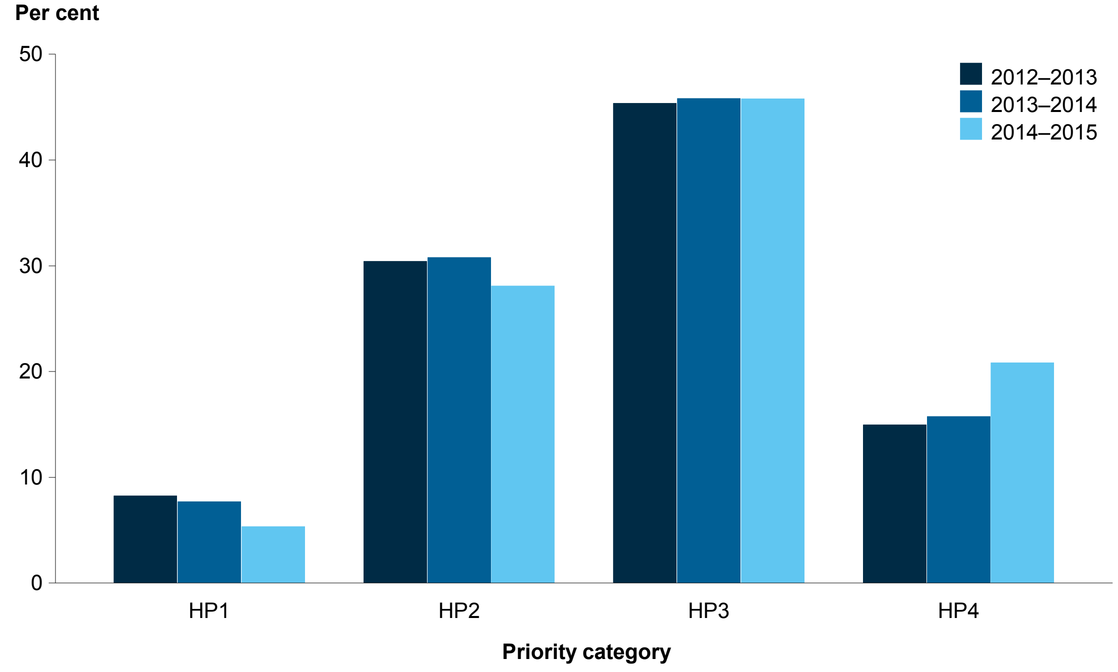
(a) Cumulative total includes data on people who received CHHC services from 1 July 2012 to 30 June 2015. It does not equal the sum of the financial years, For example, the maximum number of services is that for 2012–15, not the sum of the maximum number of services from 2012–13 to 2014–15 combined.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2015).

Among children for whom consent to share information with the AIHW was received, there were similar proportions of males and females who received CHHC services in 2014–15 (52% and 48%, respectively).

In terms of hearing health priority category, in 2014–15, category 3 (HP3) was the most common (46%), followed by category 2 (HP2) (28%). Results were generally similar for 2013–14 and over the 3 financial years combined (Appendix Table E6.1; Figure 6.1).



Notes

1. See Box 6.1 for definitions of CHHC hearing health priority categories.
2. Data are reported only where consent was obtained.

Source: Appendix Table E6.1.

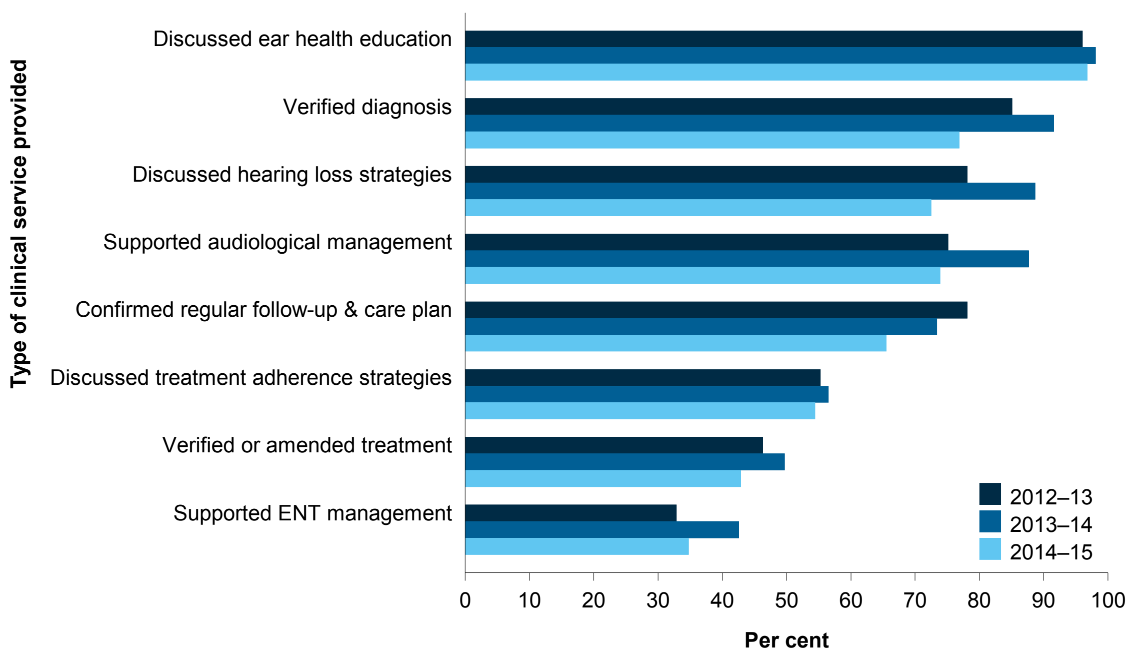
Figure 6.1: Proportion of children who received CHHC services by priority listing, 2012–13 to 2014–15

6.3 Types of services provided

A range of services have been provided by CHHCs over the course of the program. At almost all visits, CHHCs provided ear health education to children and their parents or guardians (at 98% of visits in 2013–14 and 97% in 2014–15) (Figure 6.2; Table E6.2). In 2014–15, other services commonly provided include verification of diagnosis (77% of visits), support for audiological management (74%), and discussion of strategies to minimise hearing loss (73%).

From 2013–14 to 2014–15, there was a decrease in the proportion of visits at which all types of clinical services were provided, most notably:

- discussion of strategies to minimise hearing loss (from 89% in 2013–14 to 73% in 2014–15)
- verification of diagnosis (from 92% to 77%)
- support for audiological management (from 88% to 74%) (Table E6.2).

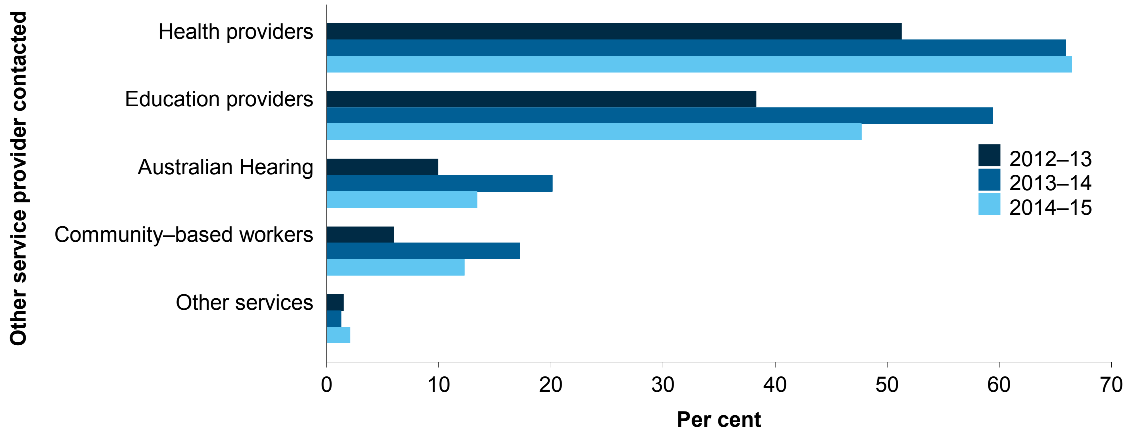


Note: Data are reported only where consent was obtained.

Source: Appendix Table E6.2.

Figure 6.2: Type of clinical services provided at CHHC visits, 2012–13 to 2014–15

CHHCs also assisted children and their families by contacting other service providers. In 2014–15, contact was made with health providers at 66% of CHHC visits, education providers at 48% of visits, and Australian Hearing at 13% of visits (Figure 6.3; Table E6.3). Between 2013–14 and 2014–15, the proportion of visits at which CHHCs made contact with health providers remained the same (66%), and decreased for education providers (from 59% to 48%), Australian Hearing (20% to 13%) and Community-based workers (17% to 12%) (Table E6.3).



Note: Data are reported only where consent was obtained.

Source: Appendix Table E6.3.

Figure 6.3: Proportion of visits at which CHHCs made contact with other service providers, by service provider type, 2012–13 to 2014–15

6.4 Ear health of service recipients

Ear conditions

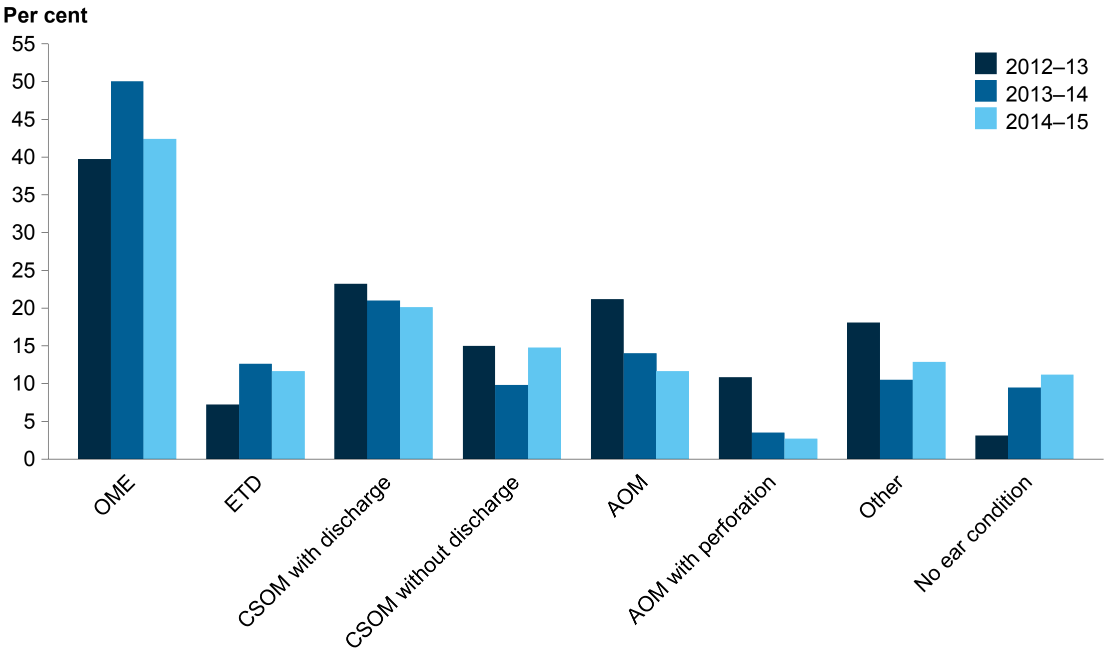
In 2014–15:

- 88% of children who received a CHHC visit were diagnosed with at least 1 ear condition at their first service, which was similar to the proportion in 2013–14 (91%)
- the most commonly diagnosed conditions were OME (42% of children), chronic suppurative otitis media (CSOM) with discharge (20%), and CSOM without discharge (15%).

Between 2013–14 and 2014–15, there was a decrease in the proportion of children with OME (50% to 42%), and an increase in the proportion with CSOM without discharge (10% to 15%) (Figure 6.4).

From July 2012 to June 2015:

- 91% of children who received CHHC visits were diagnosed with at least 1 ear condition
- the most commonly diagnosed conditions were OME (43%), CSOM with discharge (21%) and AOM (15%) (Appendix Table E6.4).



Note: Data are reported only where consent was obtained.

Source: Appendix Table E6.4.

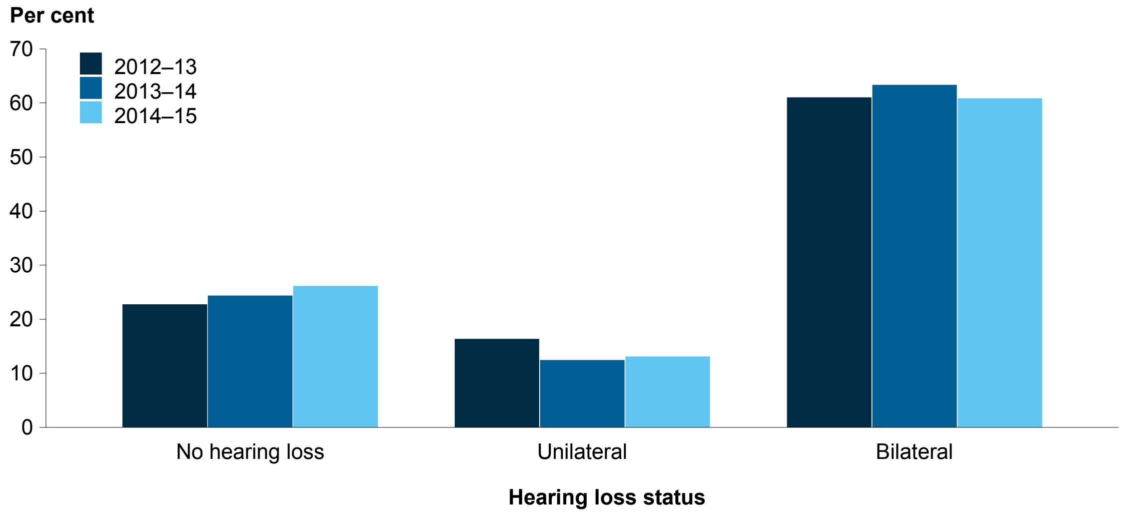
Figure 6.4: Type of ear conditions among children who received CHHC services, 2012–13 to 2014–15

A small proportion of children who were diagnosed with ear or hearing health problems before their CHHC visit recovered from their conditions before their appointment. Therefore, they were not reported as having ear conditions in the CHHC data collection. Since otitis media is a recurrent and persistent condition, children could require ongoing management even if they do not have an ear condition at the time of their CHHC visit.

Hearing loss and impairment

Data on CHHC services do not include information about hearing loss and impairment. The hearing health status of children can be determined only by linking data for children who received CHHC services as well as outreach audiology services. In the following analyses, the hearing health status of children who received CHHC services was based on data from the child's last audiology service.

- In 2014–15, of the 413 children who received a CHHC visit and for whom consent was obtained, 268 (65%) also received an audiology service. Almost three quarters of these children had some form of hearing loss. Most had bilateral loss (61%), and 13% had unilateral loss.
- The proportion of children with hearing loss was similar between 2013–14 (76%) and 2014–15 (74%), and the proportions with bilateral and unilateral hearing loss was also similar between years (Figure 6.5; Appendix Table E6.5).



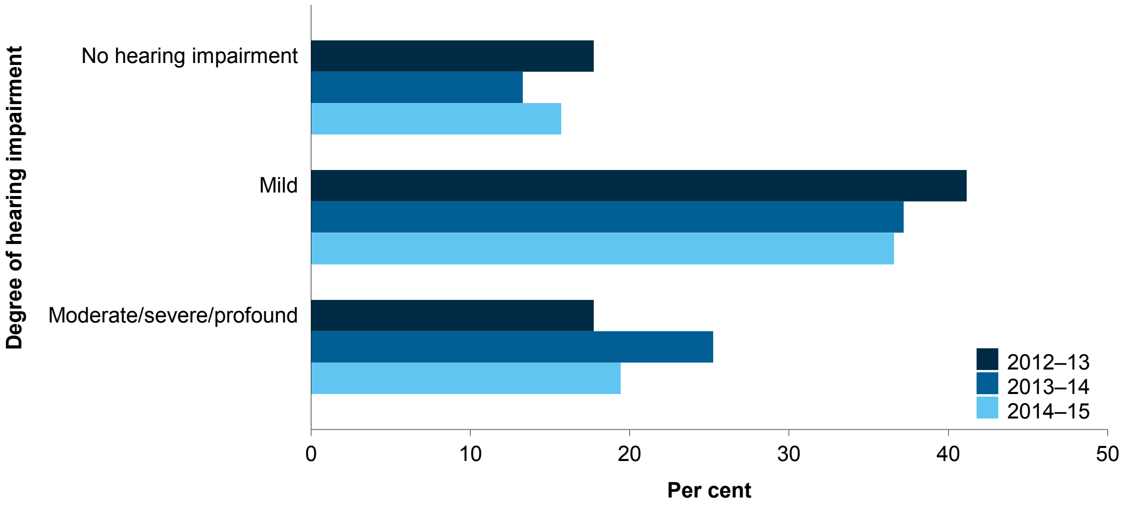
Note: Data are reported only where consent was obtained.

Source: Appendix Table E6.5.

Figure 6.5: Hearing loss status among children in the CHHC and audiology programs, 2012–13 to 2014–15

Hearing impairment among children who received both CHHC and audiology services tended to be more common and more severe than among children receiving audiology services only (see Chapter 4). This is expected, given the priority system for entry into the CHHC program. Of the children who received both CHHC and audiology services and were tested for hearing loss:

- In 2014–15, 56% had some form of hearing impairment—37% mild, and 20% moderate, severe or profound.
- The proportion of children with a hearing impairment decreased between 2013–14 and 2014–15, from 62% to 56%.
  - The proportion with mild hearing impairment remained steady at about 36%.
  - The proportion with moderate, severe or profound impairment decreased from 26% to 20% (Figure 6.6; Table E6.6).



Note: Data are reported only where consent was obtained.

Source: Appendix Table E6.6.

Figure 6.6: Degree of hearing impairment, children in the CHHC and audiology programs, 2012–13 to 2014–15

7 Ear conditions

Key findings

- In 2014–15:
  - of the 2,410 Indigenous children and young people in the Northern Territory who received an audiology or ENT service, 64% were diagnosed with at least 1 type of ear condition, most commonly OME (24%) and ETD (15%)
  - the prevalence of ear conditions was higher among younger children—73% of children aged 0–2 and 3–5 compared with 60% or less of those aged 6–10, 11–15 and 16–20
  - of the 1,532 children and young people diagnosed with at least 1 ear condition, 65% experienced hearing loss. Rates of hearing loss were highest among children and young people with CSOM with discharge (81%), OME (80%) and CSOM without discharge (78%)
  - among children and young people with at least 1 ear condition, 41% had a hearing impairment compared with only 8% of children and young people with no middle ear conditions.
- Between July 2012 and June 2015:
  - half or more of children and young people diagnosed with CSOM with discharge, OME and AOM had some form of hearing impairment (58%, 57% and 50% respectively); the severity of impairment tended to be worse among those diagnosed with these conditions, compared with other ear conditions
  - of 1,505 children and young people who received 2 or more ENT or audiology services, there was a decrease of 6 percentage points (78% to 72%) in the proportion diagnosed with at least 1 middle ear condition between the first and last service.
- From August 2007 to June 2015, among the 1,820 children and young people who received at least 3 ENT or audiology services, there was a 27 percentage point decrease in the proportion who had at least 1 type of otitis media (from 79% first service to 52% at last service).

The information presented in this chapter includes information about ear conditions diagnosed in children and young people who received hearing health services, compiled using ENT teleotology and audiology data collections. It should be noted that if children and young people received 2 or more of these services, the diagnosis made in the most recent service was used for analysis; if children and young people received 2 services on the same day (that is, one ENT service and one audiology service), the ENT diagnosis was used. Box 7.1 describes the main types of ear conditions analysed in this report. This chapter also contains information about the hearing health of these children and young people, and changes in rates of ear conditions over time.

7.1 Types of ear conditions diagnosed

In 2014–15, of the 2,410 children and young people aged 20 and under who received an audiology or ENT service:

- 64% were diagnosed with at least 1 type of ear condition at their latest service

- the most common type of ear condition was OME (24%), followed by ETD (15%) and CSOM without discharge (13%) (Appendix Table E7.1; Figure 7.1).

Between 2013–14 and 2014–15:

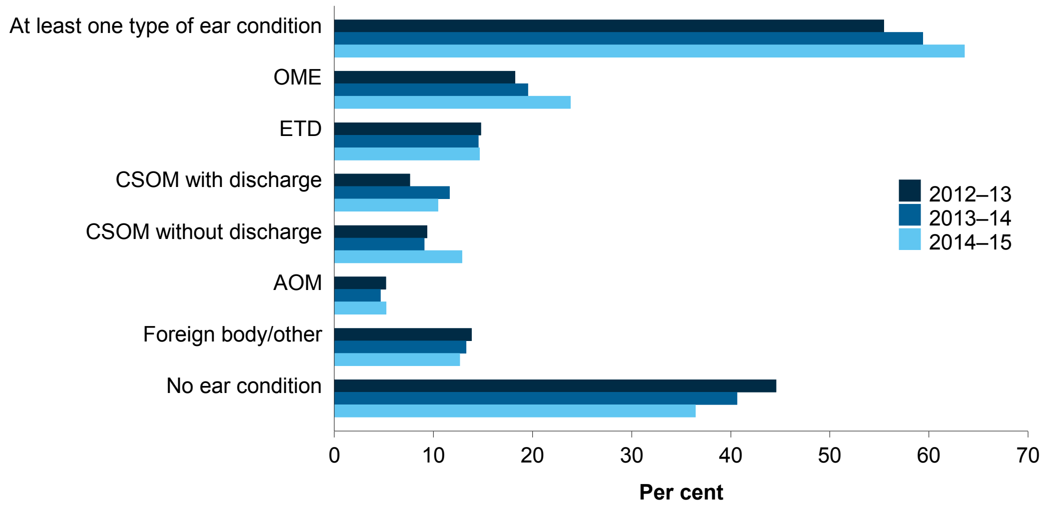
- the proportion of children and young people diagnosed with at least 1 ear condition increased from 59% to 64%
- there were increases in the proportion diagnosed with OME (20% to 24%) and CSOM without discharge (9% to 13%) (Appendix Table E7.1; Figure 7.1).

Note that increases in the proportion of children and young people with ear conditions may, in part, reflect the introduction of priority listing in 2013, whereby those with the greatest need for services are more likely to receive them.

Between July 2012 and June 2015, 10% of children and young people who received audiology or ENT services were diagnosed with CSOM with discharge (Appendix Table E7.1). The World Health Organization defines a prevalence of CSOM with discharge of 4% as a massive public health problem needing urgent action (WHO 2004); the prevalence among children and young people in the Northern Territory who received these services was more than double this rate. It should be noted, however, that those who participated in these programs do not constitute a random sample, so the data are not representative of the whole population of Indigenous children and young people in the Northern Territory.

Box 7.1: 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:
  - *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
  - *acute otitis media (AOM)*: the presence of fluid behind the eardrum plus at least one 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. It is also known as inactive CSOM or dry perforation.
- *Eustachian tube dysfunction (ETD):* negative middle ear pressure associated with compromised equalisation impeding middle ear function and sometimes causing middle ear fluid accumulation.



Note: Data are reported only where consent was obtained.

Source: Appendix Table E7.1.

Figure 7.1: Type of ear condition, children and young people who received an audiology or ENT service, 2012–13 to 2014–15

Age and sex

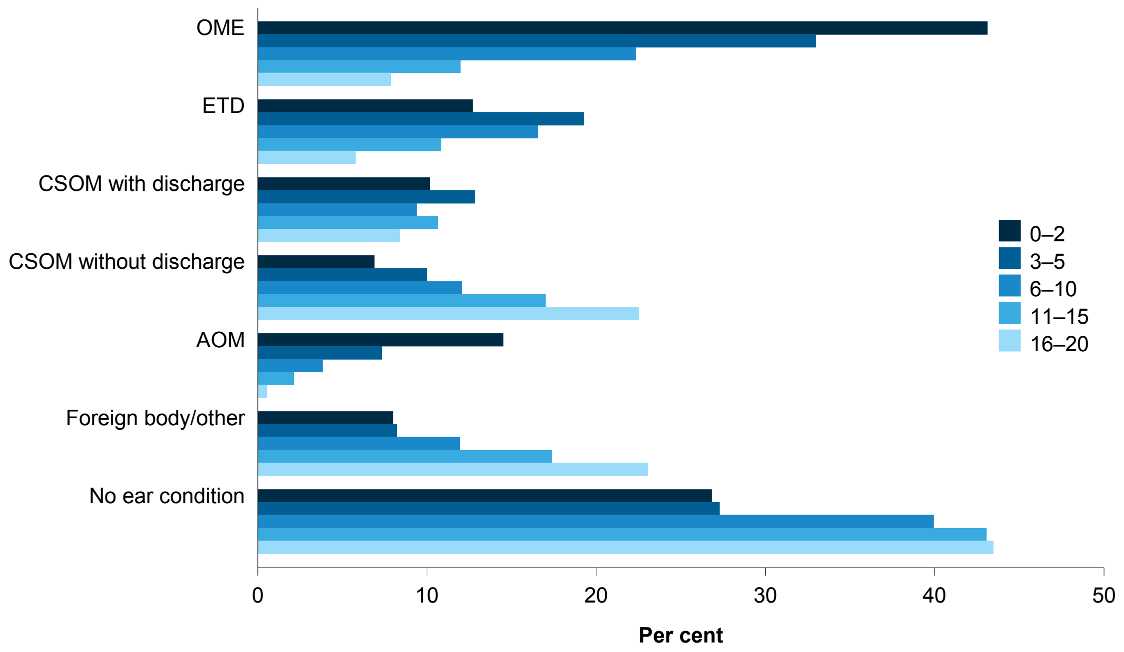
Ear conditions varied by age (Figure 7.2), but were mostly the same by sex (Table E7.1).

The prevalence of most conditions was highest among younger service recipients. In 2014–15, about three-quarters of children aged 0–2 and 3–5 had at least 1 type of ear condition (73% for both age groups) compared with 60% or less of those aged 6–10, 11–15 and 16–20 (60%, 57% and 57%, respectively) (Figure 7.2). This reflects the natural profile of ear disease, where children typically grow out of the condition (AIHW 2014).

The most common types of ear conditions differed slightly between age groups. In 2014–15:

- among children aged 0–2, the most common conditions diagnosed were OME (43%), AOM (15%), and ETD (13%). More than one-quarter (27%) of children did not have an ear condition
- among children aged 3–5, the most common conditions diagnosed were OME (33%), ETD (19%), and CSOM with discharge (13%). More than one-quarter (27%) of children did not have an ear condition
- among children aged 6–10, the most common conditions diagnosed were OME (22%), and ETD (17%), CSOM without discharge (12%); 40% did not have an ear condition
- among young people aged 11–15, the most common conditions were CSOM without discharge (17%), foreign body or other conditions (17%) and OME (12%); 43% did not have an ear condition
- among young people aged 16–20, the most common conditions were CSOM without discharge (23%), and foreign body or other conditions (23%), while 44% did not have an ear condition.

Between 2013–14 and 2014–15, the proportion of service recipients diagnosed with an ear condition generally increased for all age groups, with the largest increase among those aged 3–5 (65% to 73%) (Table E7.2).



Note: Data are reported only where consent was obtained.

Source: Appendix Table E7.2.

Figure 7.2: Type of ear conditions among children and young people who received an audiology or ENT service, by age, 2014–15

In 2014–15, the proportion of males and females diagnosed with at least 1 type of ear condition was similar (63% and 64%, respectively) and the prevalence of different types of ear conditions was generally similar between sexes (Table E7.1).

From 2013–14 to 2014–15 there was:

- an increase in the proportion of children and young people diagnosed with OME, from 21% to 24% for males, and 18% to 24% for females.
- an increase in the proportion of children and young people diagnosed with CSOM without discharge, from 9% to 12% for males, and 9% to 13% for females
- a decrease in the proportion of females diagnosed with foreign body or other conditions (17% to 12%)
- a decrease in the proportion with no ear conditions, from 42% to 37% for males, and 40% to 36% for females (Table E7.1).

7.2 Hearing loss and impairment

In 2014–15, of the 1,532 children and young people diagnosed with a least 1 ear condition:

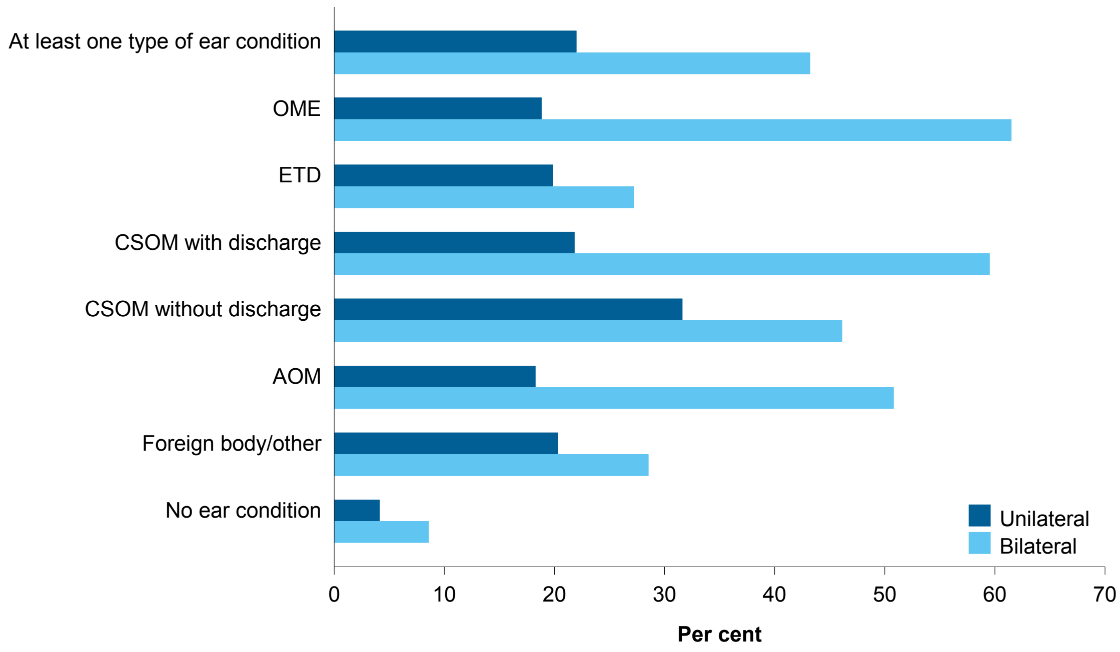
- 65% experienced hearing loss (43% with bilateral and 22% with unilateral hearing loss)
- 24% had no hearing loss, and hearing loss status was missing for 10%.

Hearing loss was experienced by 13% of children and young people who did not have any ear conditions at the time of receiving services (Appendix Table E7.3).

As shown in Figure 7.3, hearing loss status varied by the type of ear condition diagnosed. In 2014–15, rates of hearing loss were highest among children and young people with:

- CSOM with discharge (81% of those with this condition—60% bilateral and 22% unilateral)
- OME (80%–62% bilateral and 19% unilateral)
- CSOM without discharge (78%–46% bilateral and 32% unilateral).

From 2013–14 to 2014–15, the proportion of children and young people with a middle ear condition who had hearing loss remained similar (67% and 65%, respectively) (Appendix Table E7.3).



Note: Data are reported only where consent was obtained.

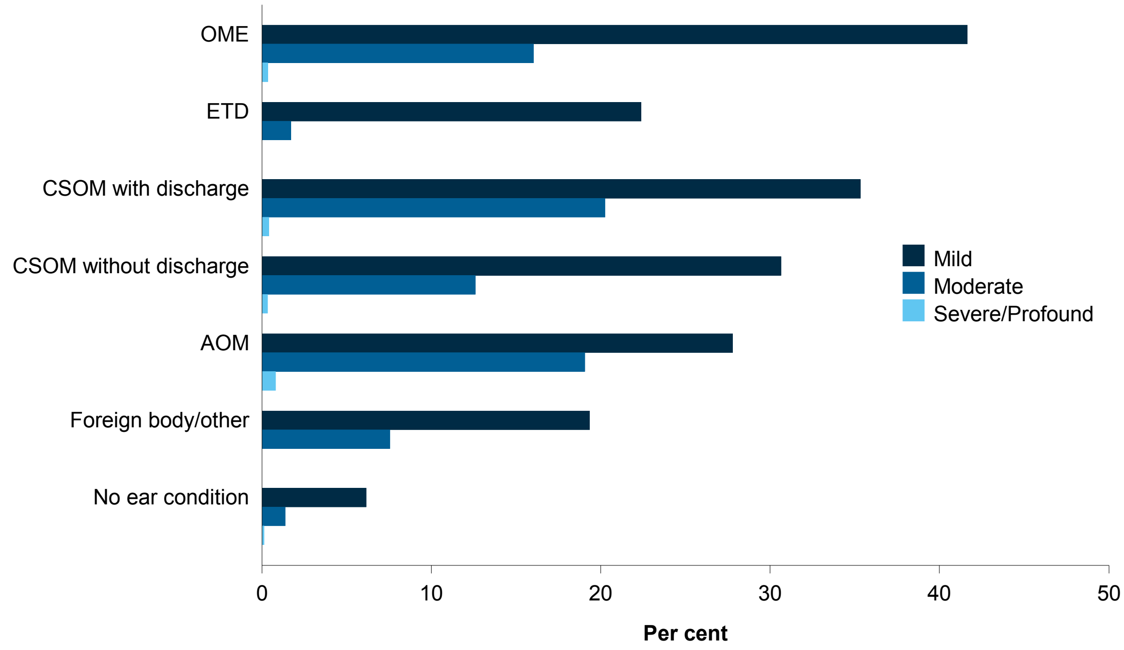
Source: Appendix Table E7.3.

Figure 7.3: Hearing loss status by ear condition among children and young people who received an audiology or ENT service, 2014–15

Degrees of hearing impairment also differed between ear conditions diagnosed. In 2014–15:

- Among children and young people with at least 1 ear condition, 41% had a hearing impairment—29% had mild impairment and 12% moderate impairment. In comparison, hearing impairment was present in 8% of children and young people who did not have any ear conditions at the time of receiving services (Figure 7.4).
- Hearing impairment was most common among children and young people diagnosed with OME (58%), CSOM with discharge (56%), and AOM (48%). The degree of hearing impairment also tended to be more severe in children and young people with these conditions, with moderate hearing impairment found in 20% of children and young people with CSOM with discharge, 19% of children and young people with AOM, and 16% of those with OME.

- 49% of children and young people with at least 1 type of ear condition were found to have no hearing impairment. In contrast, 84% of those with no ear conditions had no hearing impairment (Appendix Table E7.4).



Note: Data are reported only where consent was obtained.

Source: Appendix Table E7.4.

Figure 7.4: Degree of hearing impairment by ear condition among children and young people who received an audiology or ENT service, 2014–15

Between 2013–14 and 2014–15, among children and young people with an ear condition:

- the proportion with a hearing impairment was similar (43% and 41%, respectively)
- for most types of conditions, the proportion of children and young people with hearing impairment decreased—from 50% to 44% for CSOM without discharge, and 32% to 27% for foreign body and other conditions (Appendix Table E7.4).

7.3 Changes in ear conditions

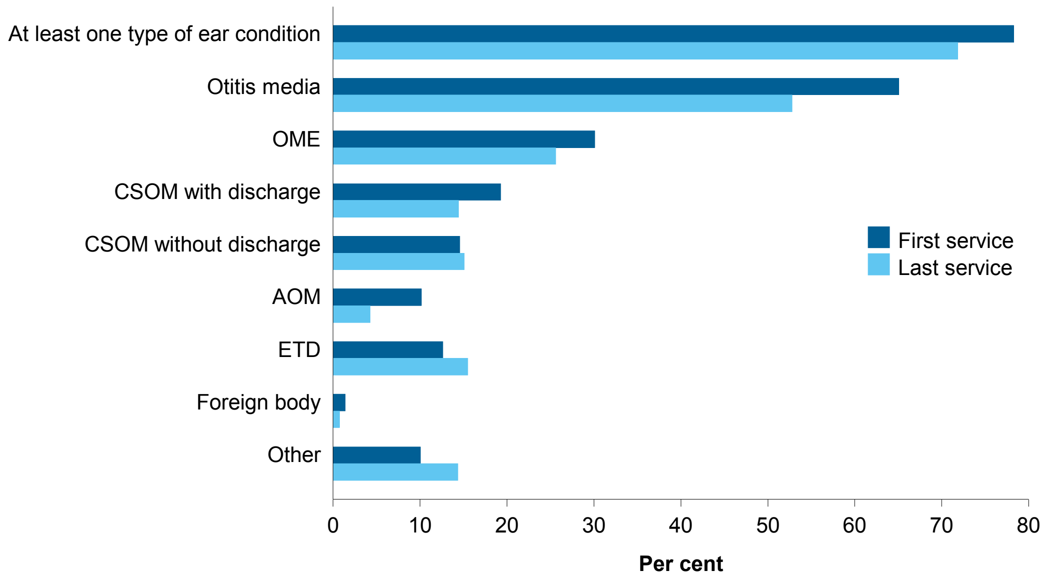
The following sections analyse changes in ear conditions over time among children and young people who received multiple audiology or ENT teleotology services. The analyses of children and young people who received at least 2 services is for 3 financial years (July 2012 to June 2015), while analyses of those who received at least 3 services are for a longer period (August 2007 to June 2015). As different periods are analysed, the data presented are not directly comparable between the results on children and young people who received at least 2 services and those who received at least 3 services.

Children and young people who received at least 2 services

This section assesses whether the prevalence of ear conditions improved between the first and last service for children and young people who were on the treatment pathway (that is, who received 2 or more ENT or audiology services between July 2012 and June 2015). To measure change over time and observe the outcomes of treatment, this analysis includes only children and young people with a minimum time interval of 3 months between the first and last service.

Figure 7.5 shows that out of about 1,505 children and young people who received 2 or more audiology or ENT services between July 2012 and June 2015, the proportion diagnosed with at least 1 ear condition decreased by 6 percentage points (from 78% to 72%) between the first and last service. There was some variation in the extent of change over time between different types of ear conditions. Between first and last services:

- there was a decrease of 12 percentage points in the proportion of children and young people diagnosed with otitis media (which includes OME, CSOM with discharge, CSOM without discharge and AOM). The rate decreased from 65% to 53%:
  - there were decreases in the proportions of children and young people diagnosed with AOM (from 10% to 4%), OME (30% to 26%) and CSOM with discharge (from 19% to 14%).
- the proportion of those diagnosed with ETD increased from 13% to 16%
- there was little change in rates for CSOM without discharge (about 15%) and foreign body (about 1%)
- the proportion with no ear conditions increased from 22% to 28% (Appendix Table E7.5).



Notes

1. Otitis media includes OME, CSOM with discharge, CSOM without discharge and AOM.
2. 'Other' includes grommets, reduced ear drum movement or retracted ear drum, or other ear conditions.
3. Data are reported only where consent was obtained.

Source: Appendix Table E7.5.

Figure 7.5: Change in prevalence of ear conditions between first and last hearing health service, July 2012 to June 2015

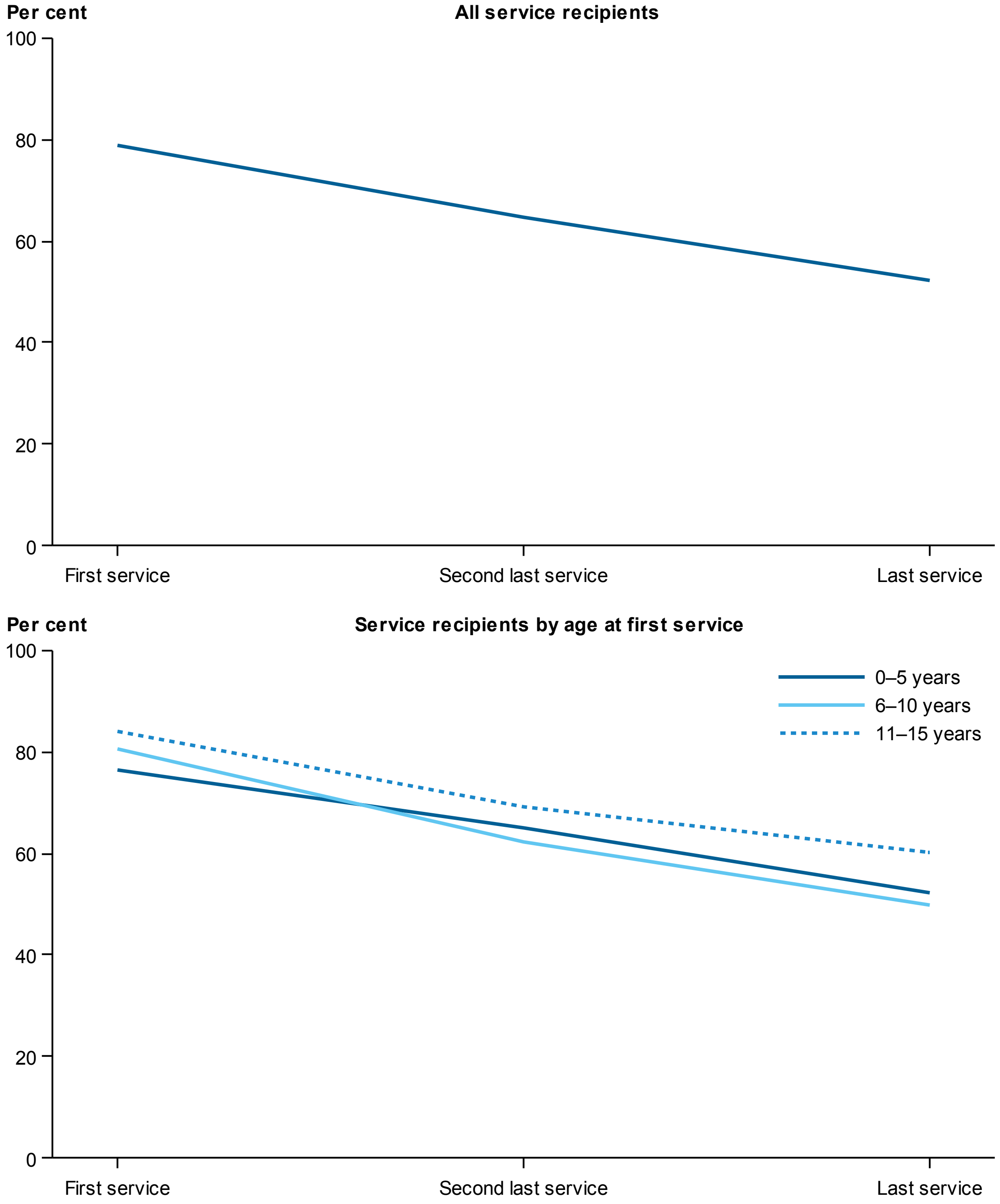
Children and young people who received at least 3 services

Figure 7.6 shows changes in the proportion of children and young people aged under 16 with some form of otitis media (that is, AOM, CSOM with discharge, OME or CSOM without discharge) among those who received at least 3 ENT or audiology services between August 2007 and June 2015. These conditions were chosen for analysis as they were the most common among service recipients.

The cross-sectional analysis shows that among the 1,820 children and young people analysed, 79% had at least 1 type of otitis media at their first service. This decreased to 65% at the second last service, and 52% at the last service—an overall decrease of 27 percentage points between the first and last service.

The age groups 0–5, 6–10 and 11–15 (based on age at first service) were also analysed in this way because the profiles of younger and older age groups often differ in terms of hearing conditions, treatment pathways and outcomes in hearing health status. Between age groups, patterns in rates of otitis media between services were similar, with the proportions decreasing for all groups. The change in rates between the first and last service were largest among those aged 6–10:

- Among children aged 0–5, the proportion with otitis media was 77% at the first service, 65% at the second last service, and 52% at the last service—a decrease of 24 percentage points.
- Among children aged 6–10, the proportion with otitis media was 81% at the first service, 63% at second last service, and 50% at last service—a decrease of 31 percentage points.
- Among young people aged 11–15, the proportion with otitis media was 84% at the first service, 69% at the second last service, and 60% at the last service—a decrease of 24 percentage points (Figure 7.6; Table E7.6).



Notes

1. Includes children and young people who received 3 or more audiology and/or ENT services between July 2012 and June 2015. Excludes children and young people with missing or not tested responses for hearing loss status.
2. Minimum time between services: 3 months. Median time interval between the first and second last service: 25 months. Median time interval between the second last and last service: 12 months.
3. Data are reported only where consent was obtained.

Source: Appendix Table E7.6.

Figure 7.6: Proportion of children and young people with otitis media (OME, CSOM with discharge, AOM or CSOM without discharge) at first hearing health outreach service, second last service and last service (among those who received 3 or more services), August 2007 to June 2015

7.4 Disease progression of chronic otitis media

This section examines the progress of children and young people with chronic otitis media (that is, CSOM with discharge and CSOM without discharge). Between August 2007 and June 2015, there were 2,351 children and young people who received audiology or ENT services with a diagnosis of CSOM with discharge (1,521) or CSOM without discharge (1,704) (service recipients might have been diagnosed with both conditions at different services during the period analysed). By the end of June 2015, the proportion of children and young people who had received another service at least 3 months after their initial diagnosis was 40% for CSOM with discharge and 44% for CSOM without discharge.

Figure 7.7 shows that, among the children and young people who were diagnosed with CSOM with discharge at an initial ENT or audiology service:

- most of the children and young people still had an ear condition at their latest service—33% still had CSOM with discharge, while 30% developed CSOM without discharge, 6% OME, 3% AOM and 7% other conditions (Figure 7.7a; Table E7.7)
- 23% had no ear conditions at their latest service.

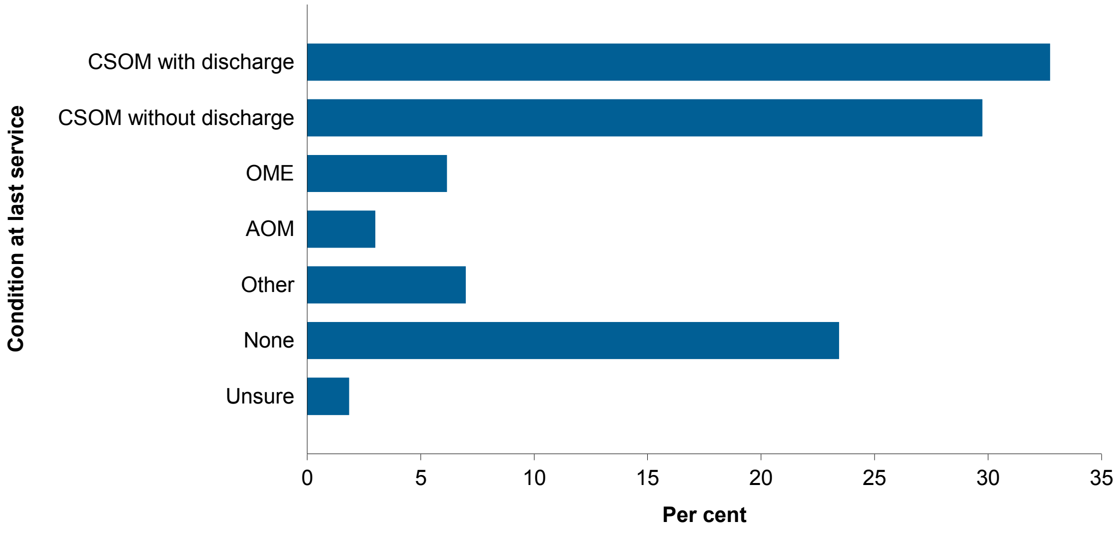
Among the children and young people who were diagnosed with CSOM without discharge at an initial ENT or audiology service:

- one-third (34%) still had CSOM without discharge at their latest check, while 20% developed CSOM with discharge, 7% OME, 1% AOM and 8% other conditions (Figure 7.7b; Table E7.7)
- one-third (33%) had no ear conditions at their latest service.

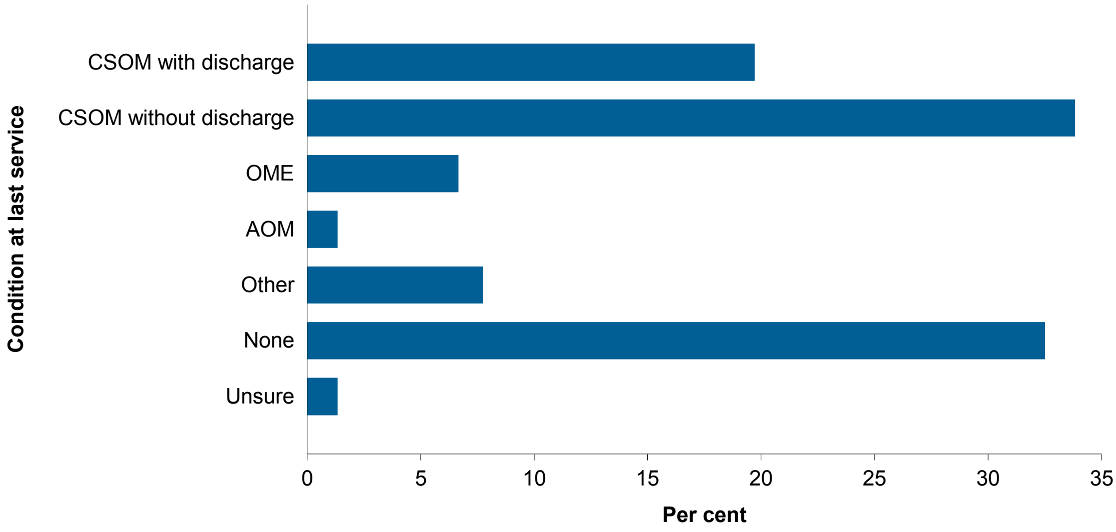
Although there were some improvements in both groups analysed, overall, the results generally suggest poor progress in children and young people diagnosed with CSOM with discharge or CSOM without discharge at an initial service, with the majority still experiencing the same condition or developing another type of ear disease over their course of treatment.

Caution should be exercised when interpreting the information above, as the progress of children and young people with chronic otitis media who have not returned for Northern Territory hearing health outreach services is not known—for example, children and young people may have accessed services at a hospital or urban facility, had surgery intervention, or be candidates for surgery.

(a) Ear conditions at last service among children and young people with CSOM with discharge at initial service



(b) Ear conditions at last service among children and young people with CSOM without discharge at initial service



Notes

1. ‘Initial service’ refers to the initial service at which a child or young person was diagnosed with CSOM with discharge or CSOM without discharge, which is not necessarily the service recipient’s first audiology or ENT service.
2. Minimum time between initial and last services: 3 months. Median time interval: 37 months. Maximum time interval: 87 months
3. Data are reported only where consent was obtained.

Source: Appendix Table E7.7.

Figure 7.7: Progress of children and young people with ear conditions between the initial and last service, August 2007 to June 2015

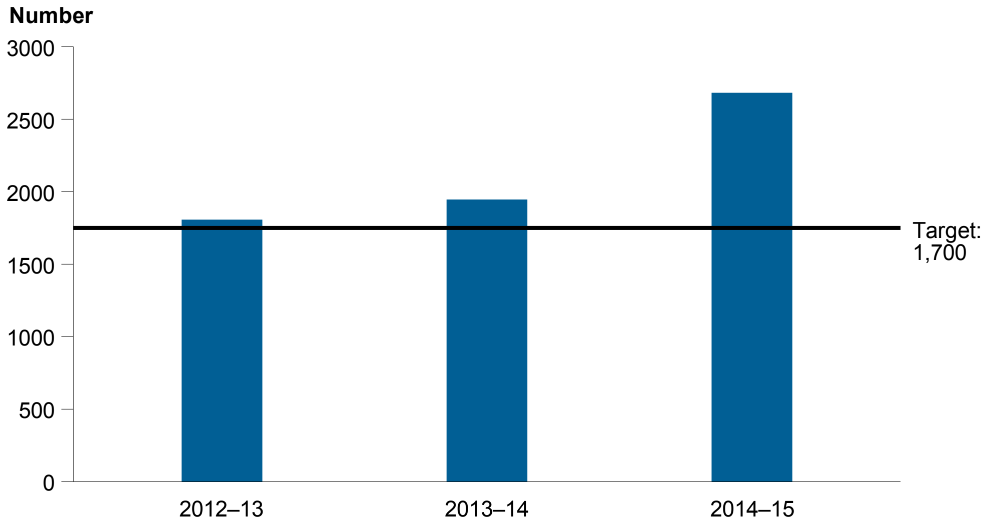
8 Performance benchmarks for National Partnership Agreement on Stronger Futures in the Northern Territory

This chapter reports on the outcomes achieved during the SFNT hearing health program relative to the targets set jointly by the Australian and Northern Territory departments of health. The measures are based on both service delivery (number of services provided) (Section 8.1), and on outcomes in ear and hearing health (Section 8.2).

The data presented in this chapter are for SFNT only (that is, for children and young people aged under 16); therefore the numbers should not be directly compared with those presented in earlier chapters that include service recipients aged 0–20.

8.1 Service delivery

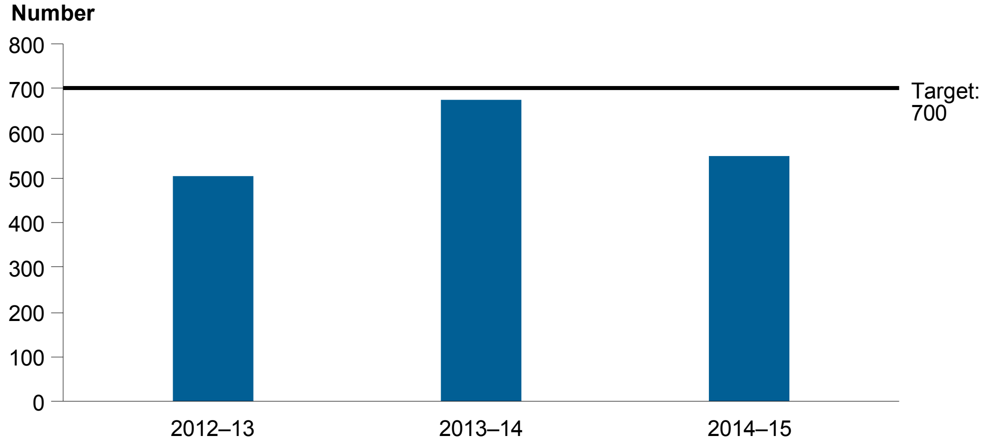
The SFNT program aimed to provide 1,700 audiology services per financial year. For the last 3 years of the program, this target was surpassed—the number of services increased each year, from 1,815 in 2012–13 to 1,971 in 2013–14 and 2,699 in 2014–15 (Figure 8.1; Table E8.1).



Source: Appendix Table E8.1.

Figure 8.1: Number of audiology checks against benchmark number, 2012–13 to 2014–15

The target set for the number of children to receive CHHC services was 700, with 7 CHHCs each case-managing 100 children. The target was not reached in any years of the SFNT program. More than 500 children were visited by CHHCs in 2012–13, 675 children in 2013–14, and 550 children in 2014–15 (Figure 8.2; Table E8.2). The reduction in the number of children who received CHHC services between 2013–14 and 2014–15 (from 675 to 550) can be partially explained by difficulties in the recruitment of CHHCs for the program in 2014–15.



Source: Appendix Table E8.2.

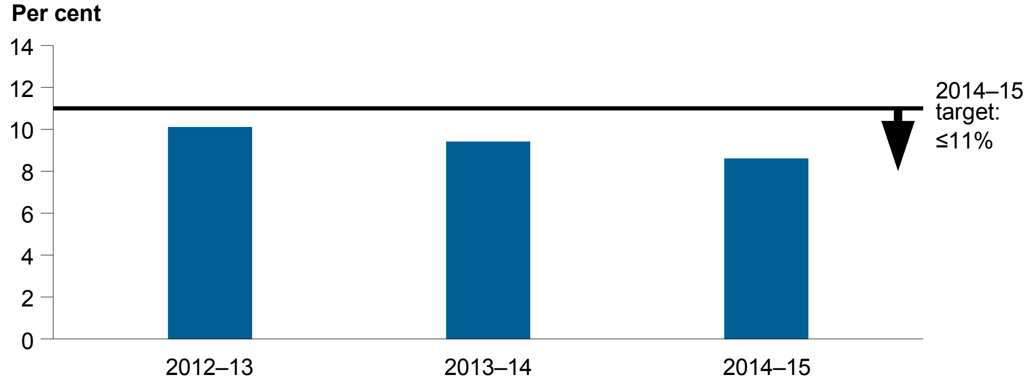
Figure 8.2: Number of CHHC checks against benchmark number, 2012–13 to 2014–15

8.2 Outcomes

It is important to measure the effects of the SFNT hearing health program in terms of service delivery and also in the ear and hearing health of the children and young people who received the services. Targets for hearing impairment and improvement were set for 2014–15, and the numbers reported here are provided to indicate progress towards these goals in 2012–13 and 2013–14, and the achievement of these goals in 2014–15. The following sections (and tables E8.3 and E8.4) show the 2014–15 outcome targets and the results that were achieved in 2012–13, 2013–14 and 2014-15.

Hearing impairment

The 2014–15 target for the proportion of children and young people who received audiology services with moderate and severe conductive hearing impairment was 11% or less, and this target was achieved. In 2012–13, the proportion of children and young people with moderate and severe conductive hearing impairment was 10%, and in 2013–14 and 2014–15 the proportion was 9% (Figure 8.3; Table E8.3).



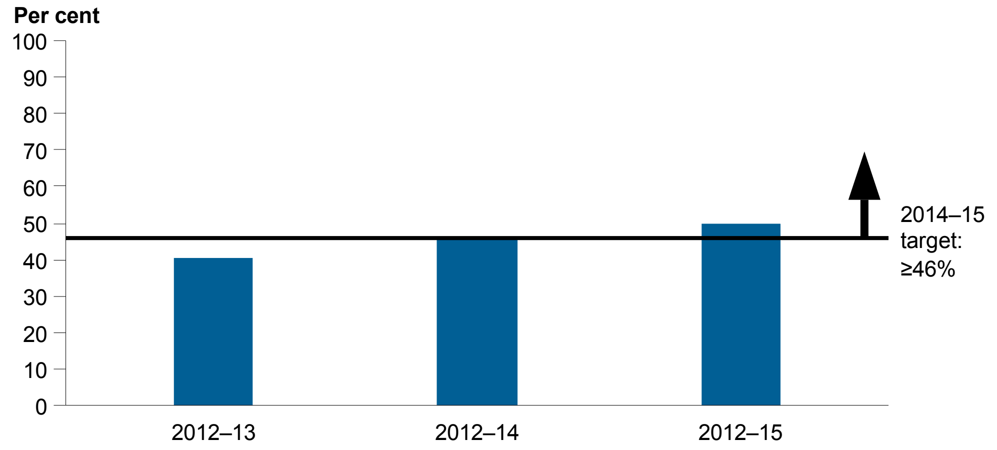
Source: Appendix Table E8.3.

Figure 8.3: Progress against 2014–15 target for moderate and severe conductive hearing impairment, 2012–13 to 2014–15

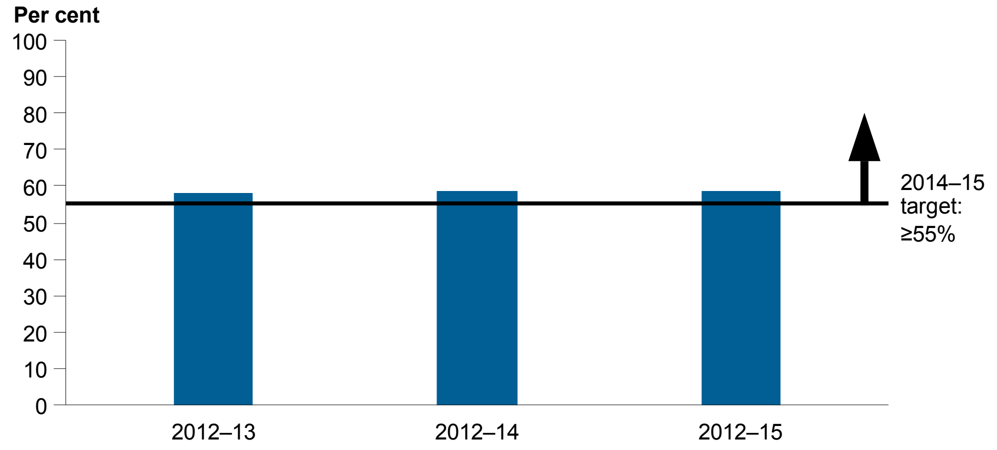
Among children and young people who received 2 or more services from July 2012 to June 2015, the targets for hearing improvement (defined as a movement to a less severe hearing impairment category) were achieved for both age groups (0–5 and 6–15) by June 2015:

- Half of the children aged 0–5 at their first service and who received 2 or more services between July 2012 and June 2015 had improved hearing. This was over the target of 46%. (Figure 8.4a; Table E8.4).
- More than half (59%) of children and young people aged 6–15 at their first service and who received 2 or more services between July 2012 and June 2015 had improved hearing. This was over the target of 55%(Figure 8.4b; Table E8.4).

(a) Children with improved hearing (ages 0–5)



(b) Children and young people with improved hearing (ages 6–15)



Source: Appendix Table E8.4.

Figure 8.4: Progress against 2014–15 targets for improved hearing, 2012–13, 2012–14 and 2012–15

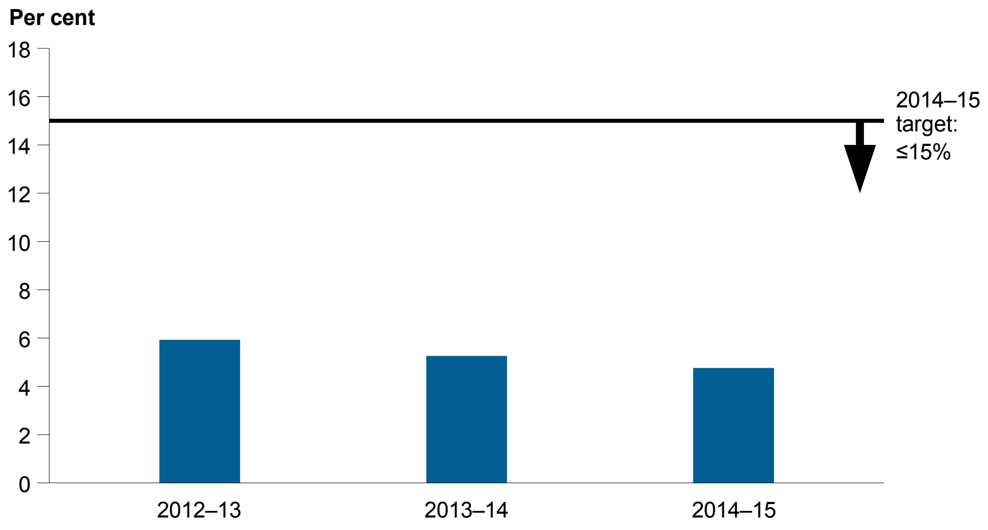
Middle ear conditions

The 2014–15 targets for the proportion of service recipients with CSOM with discharge were achieved for age groups 0-5 and 6–15:

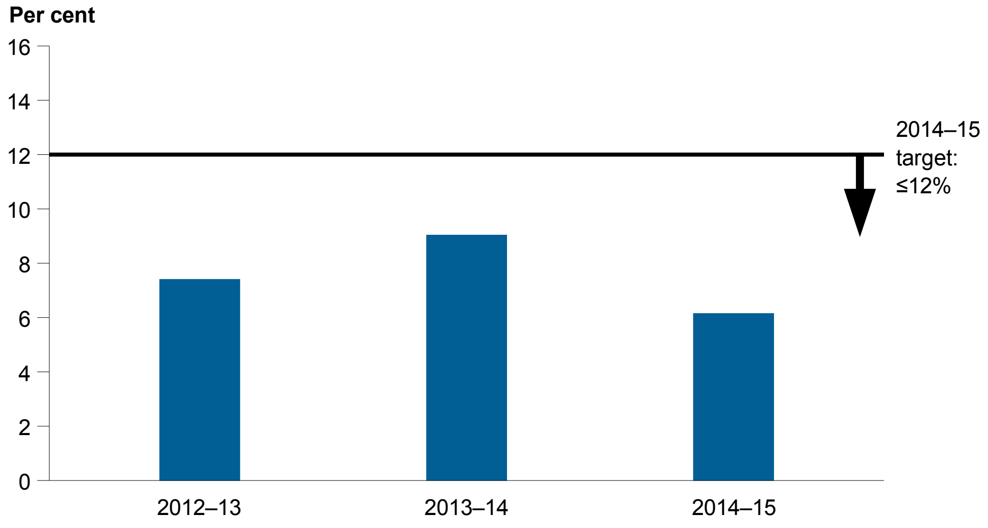
- Among children aged 0–5, the target was to have 15% or less with CSOM with discharge. The proportion was 6% in 2012–13, and 5% in both 2013–14 and 2014–15 (Figure 8.5a; Table E8.3).

- Among children and young people aged 6–15, the target was to have 12% or less with CSOM with discharge. The proportion was 7% in 2012–13, 9% in 2013–14 and 6% in 2014–15 (Figure 8.5b; Table E8.3).

(a) Children with CSOM with discharge (ages 0–5)



(b) Children and young people with CSOM with discharge (ages 6–15)

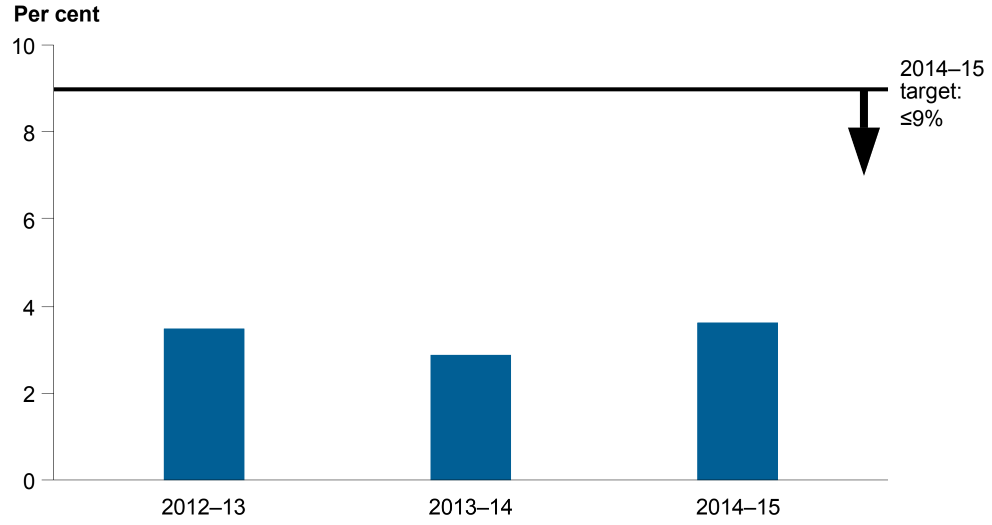


Source: Appendix Table E8.3.

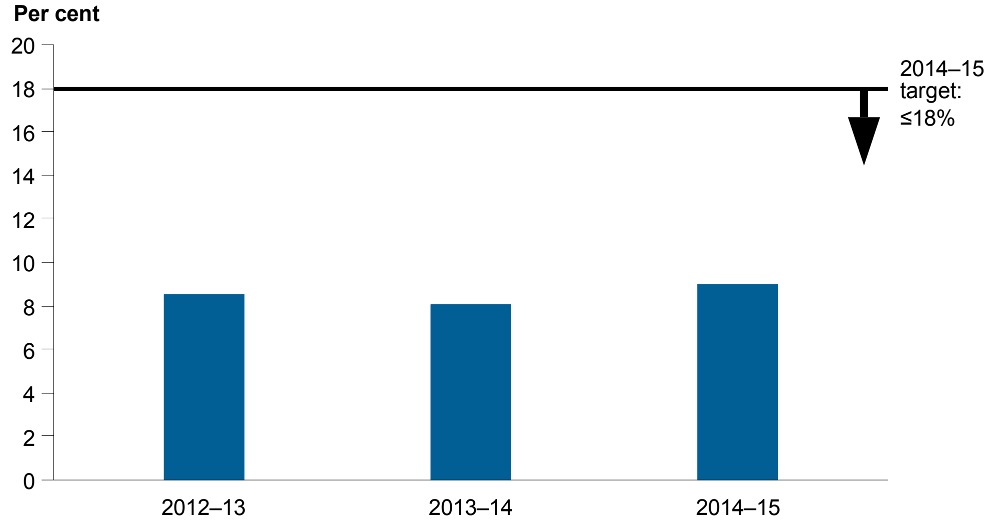
Figure 8.5: Progress against 2014–15 targets for proportion of service recipients with CSOM with discharge, ages 0–5 and 6–15, 2012–13 to 2014–15

The 2014–15 targets for the proportion of service recipients with CSOM without discharge were achieved for age groups 0–5 and 6–15:

- Among children aged 0–5, the target was to have 9% or less with CSOM without discharge. The proportion was 4% in 2012–13, 3% in 2013–14 and 4% in 2014-15 (Figure 8.6a; Table E8.3).
- Among children and young people aged 6–15, the target was to have 18% or less with CSOM with discharge. The proportion was 9% in 2012–13, 8% in 2013–14 and 9% in 2014–15 (Figure 8.6b; Table E8.3).



(a) Children with CSOM without discharge (ages 0–5)

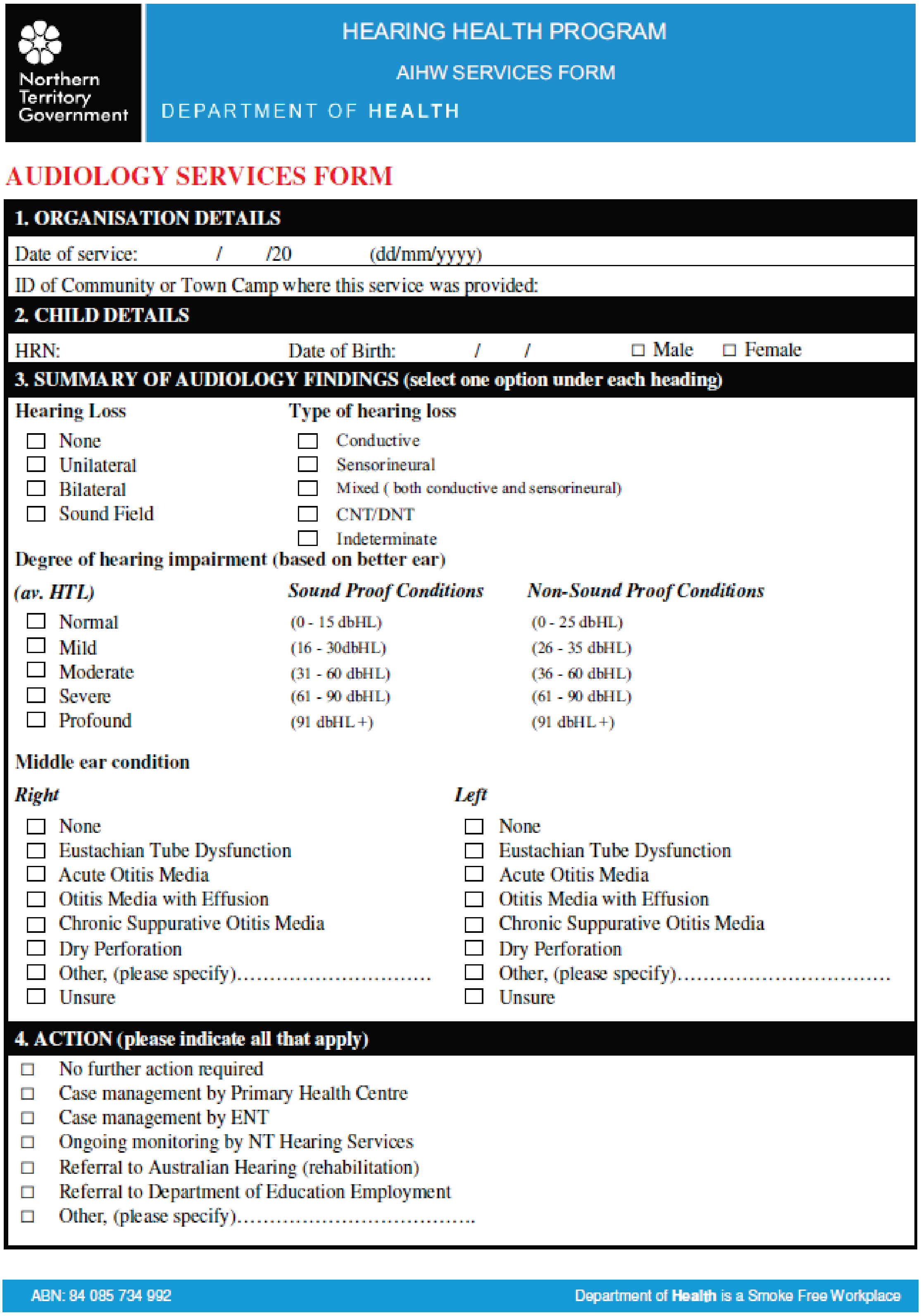


(b) Children and young people with CSOM without discharge (ages 6–15)

Source: Appendix Table E8.3.

Figure 8.6: Progress against 2014–15 targets for proportion of service recipients with CSOM without discharge, ages 0–5 and 6–15, 2012–13 to 2014–15

Appendix A: Data collection forms and information collected



Northern Territory Government

HEARING HEALTH PROGRAM

AIHW SERVICES FORM

DEPARTMENT OF **HEALTH**

AUDIOLOGY SERVICES FORM

1. ORGANISATION DETAILS

Date of service: / /20 (dd/mm/yyyy)

ID of Community or Town Camp where this service was provided:

2. CHILD DETAILS

HRN: Date of Birth: / / ☐ Male ☐ Female

3. SUMMARY OF AUDIOLOGY FINDINGS (select one option under each heading)

Hearing Loss

- ☐ None
- ☐ Unilateral
- ☐ Bilateral
- ☐ Sound Field

Type of hearing loss

- ☐ Conductive
- ☐ Sensorineural
- ☐ Mixed (both conductive and sensorineural)
- ☐ CNT/DNT
- ☐ Indeterminate

Degree of hearing impairment (based on better ear)

(av. HTL)	*Sound Proof Conditions*	*Non-Sound Proof Conditions*
☐ Normal	(0 - 15 dbHL)	(0 - 25 dbHL)
☐ Mild	(16 - 30dbHL)	(26 - 35 dbHL)
☐ Moderate	(31 - 60 dbHL)	(36 - 60 dbHL)
☐ Severe	(61 - 90 dbHL)	(61 - 90 dbHL)
☐ Profound	(91 dbHL +)	(91 dbHL +)

Middle ear condition

Right

- ☐ None
- ☐ Eustachian Tube Dysfunction
- ☐ Acute Otitis Media
- ☐ Otitis Media with Effusion
- ☐ Chronic Suppurative Otitis Media
- ☐ Dry Perforation
- ☐ Other, (please specify)…………………………
- ☐ Unsure

Left

- ☐ None
- ☐ Eustachian Tube Dysfunction
- ☐ Acute Otitis Media
- ☐ Otitis Media with Effusion
- ☐ Chronic Suppurative Otitis Media
- ☐ Dry Perforation
- ☐ Other, (please specify)……………………………
- ☐ Unsure

4. ACTION (please indicate all that apply)

- ☐ No further action required
- ☐ Case management by Primary Health Centre
- ☐ Case management by ENT
- ☐ Ongoing monitoring by NT Hearing Services
- ☐ Referral to Australian Hearing (rehabilitation)
- ☐ Referral to Department of Education Employment
- ☐ Other, (please specify)……………………………….

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Northern Territory Government

HEARING HEALTH PROGRAM
CHHC SERVICE FORM

DEPARTMENT OF HEALTH

COMMUNITY:	**CHHC:**	**VISIT DATE:** / /
FIRST NAME:	**OTHER NAME:**	
FAMILY NAME:	**HRN:**	
DOB: / /	☐ **MALE** ☐ **FEMALE**	**CARER:**

EAR HEALTH

OTOSCOPY

Right Tympanic Membrane

Pneumatic Otoscopy Mobility:

☐ **None** ☐ **Slight** ☐ **Normal**

☐**DNT**

COMMENTS:

Left Tympanic Membrane

Pneumatic Otoscopy Mobility:

☐ **None** ☐ **Slight** ☐ **Normal**

☐**DNT**

COMMENTS:

PRIORITY

☐HP1 ☐HP2 ☐HP3 ☐HP4

See Table 2: Priority Activities

CLINICAL SERVICE ACTIVITIES		**Comments**
Verified Diagnosis	☐	
Verified or Amended Treatment	☐	
Confirmed Regular Follow Up & Care Plan	☐	
Discussed Treatment Adherence Strategies	☐	
Discussed Hearing Loss Strategies	☐	
Discussed Ear Health Education	☐	
Supported Audiological M'ment	☐	
Supported ENT Management	☐	

TYMPANOMETRY

EAR	**TYPE**	**MEP**	**MEC**	**ECV**	**DNT**
RIGHT					
LEFT					

DIAGNOSIS AS PER CARPA	**Right**	**Left**
NAD / None	☐	☐
Eustachian Tube Dysfunction	☐	☐
Otitis Media with effusion	☐	☐
Acute Otitis Media without perforation	☐	☐
Acute Otitis Media with perforation	☐	☐
Chronic Suppurative Otitis Media	☐	☐
Dry Perforation	☐	☐
Other......................................	☐	☐

CONTACT WITH OTHER PROVIDERS		**Details**
Education Providers	☐	
Health Provider	☐	
Community-based Worker	☐	
Australian Hearing	☐	
Other	☐	

COMMENTS

☐ Results entered into PCIS / Communicare   Clinician Name:... Signature:..............................

Northern
Territory
Government

HEARING HEALTH PROGRAM

TELEOTOLOGY ENT SPECIALIST CONSULTATION

DEPARTMENT OF **HEALTH**

COMMUNITY:		**ENT SPECIALIST:**	**VISIT DATE:** / /
COMMUNITY ID:	**DOB:** / /	**HRN:**	**MEDICARE:**
PATIENT NAME:		☐ **MALE** ☐ **FEMALE**	**CARER:**

☐ **Post-Op Check**

THE FOLLOWING CLINICAL DIAGNOSIS AND RECOMMENDATIONS BY THE ENT SPECIALIST ARE BASED ON CASE HISTORY, AUDIOLOGY AND OTOSCOPY INFORMATION COLLECTED THROUGH TELEOTOLOGY PROTOCOL WITH NO DIRECT EXAMINATION OF THE PATIENT BY THE ENT SPECIALIST.

Right Tympanic Membrane

Left Tympanic Membrane

Comment:

RIGHT EAR

☐ Intact TM	☐ Normal ☐ Healed ☐ Other:	
☐ Perforation	☐ Central ☐ Marginal ☐ Attic ☐ **WET** ☐ Purulent ☐ **DRY** ☐ Squamous ☐ Moist (serous) ☐ Mucosal	**SIZE** ☐ Pinhole ☐ Medium ☐ Subtotal ☐ Total
☐ Grommet	☐ Insitu ☐ Patent ☐ Blocked ☐ Extruded ☐ TM Intact ☐ Residual perforation	

LEFT EAR

☐ Intact TM	☐ Normal ☐ Healed ☐ Other:	
☐ Perforation	☐ Central ☐ Marginal ☐ Attic ☐ **WET** ☐ Purulent ☐ **DRY** ☐ Squamous ☐ Moist (serous) ☐ Mucosal	**SIZE** ☐ Pinhole ☐ Medium ☐ Subtotal ☐ Total
☐ Grommet	☐ Insitu ☐ Patent ☐ Blocked ☐ Extruded ☐ TM Intact ☐ Residual perforation	

PRESUMPTIVE DIAGNOSIS	**R**	**L**
NAD		
AOM		
AOM with Perforation		
CSOM (active discharge)		
CSOM (inactive <u>dry perforation)</u>		
OME		
Foreign Body		
Other		

Insufficient information for Dx
☐ Needs teleotology review
☐ Needs ENT F2F

Comment:

Signature: ______________________________

Date: _________/_______/___________

ACTIONS RECOMMENDED		**INSTRUCTIONS**	**R**	**L**
Medication:	☐ Amoxyl ☐ Ciloxan ☐ Kenacomb ☐ Other	☐ as per CARPA Specific Instructions:	☐	☐
Other:	☐ Foreign body removal ☐ Aural Toilet ☐ Other	Specific Instructions:	☐	☐

FOLLOW-UP REQUIRED

PRIMARY HEALTH:	☐ Not Required ☐ Review progress after medication ☐ Dry ear precautions ☐ Monitor-Rx as required ☐ 1 week ☐ 2 week ☐ 1month ☐ 6 months ☐ PRN Comment:		
Audiology:	☐ Not Required ☐ 3 months ☐ 6 months ☐ 1 year ☐ PRN		
Australian Hearing:	<u>Hearing aid:</u> Medical clearance given to fit ☐ Bone conductor aid ☐ Hearing aid/s with mold ☐ Has hearing aid/s Review required	**R** ☐	**L** ☐
ENT Review:	☐ Not Required ☐ 3 months ☐ 6 months ☐ 1 year ☐ PRN ☐ Needs F2F ENT		

SURGERY RECOMMENDATIONS	☐ Yes ☐ No ☐ Too young for surgery	**R**	**L**
☐ Decide ear at operation ☐ TWAIT completed Comment:	Myringoplasty (Tympanoplasty Type 1)		
	Myringotomy		
	Adenoidectomy		
	Grommets		
	EUA		
	Exploration of middle ear/mastoid		
	Removal of tubes		
	Other procedure		

ABN: 84 085 734 992

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Appendix B: Data quality statements

Northern Territory outreach audiology data collection

Summary of key issues

- Children and young people who receive outreach audiology services are not a random sample of Indigenous children in the Northern Territory. Although outreach audiology services are available to all Indigenous children aged 21 and under, not all eligible children access these services.
- The data collected as part of the hearing health programs are a by-product of a clinical process. That is, health professionals providing services document the results on standard data collection forms, which are then forwarded to the AIHW.
- The extent of missing data should be taken into account when using and interpreting hearing health data. Where possible, published tables show the percentage of missing data.

Description

The Northern Territory outreach audiology data collection contains data from outreach audiology services provided in the Northern Territory, funded by two Australian Government programs: The National Partnership Agreement on Stronger Futures in the Northern Territory (SFNT) and the Healthy Ears—Better Hearing, Better Listening programme.

The SFNT began in July 2012 and provides funding to 2021–22. The hearing health component of this agreement replaced, and expanded upon, services implemented under the Northern Territory Emergency Response Child Health Check Initiative and the Closing the Gap in the Northern Territory National Partnership Agreement (CHCI(CtG)). The funding was mainly used to provide outreach audiology services to children aged under 16.

The Healthy Ears—Better Hearing, Better Listening programme was used to support outreach audiology services for people aged 16–20 who are not eligible under SFNT. In addition, the Healthy Ears—Better Hearing, Better Listening programme funded additional audiology services to children aged 0–15. Although all Indigenous children and young people aged 0–21 are eligible to receive these services, the AIHW currently have data for people aged up to 20 years only. In the Northern Territory, the Healthy Ears services have mainly been delivered by outreach service teams to children and young people in remote areas because there are insufficent local services to meet the high demand in these areas.

Institutional environment

This section provides information about the origin of the data collection and the arrangements under which the collection is governed and administered.

The Australian Institute of Health and Welfare (AIHW) is a major national agency set up by the Australian Government under the *Australian Institute of Health and Welfare Act* 1987 to provide reliable, regular and relevant information and statistics on Australia's health and welfare. It is an independent corporate Commonwealth entity established in 1987, governed by a management Board, and accountable to the Australian Parliament through the Health portfolio.

The AIHW aims to improve the health and wellbeing of Australians through better health and welfare information and statistics. It collects and reports information on a wide range of topics and issues, ranging from health and welfare expenditure, hospitals, disease and injury, and mental health, to ageing, homelessness, disability and child protection.

The Institute also plays a role in developing and maintaining national metadata standards. This work contributes to improving the quality and consistency of national health and welfare statistics. The Institute works closely with governments and non-government organisations to achieve greater adherence to these standards in administrative data collections to promote national consistency and comparability of data and reporting.

One of the main functions of the AIHW is to work with the states and territories to improve the quality of administrative data and, where possible, to compile national datasets based on data from each jurisdiction, to analyse these datasets and disseminate information and statistics.

The *Australian Institute of Health and Welfare Act* 1987, in conjunction with compliance to the *Privacy Act* 1988, (Cth) ensures that the data collections managed by the AIHW are kept securely and under the strictest conditions with respect to privacy and confidentiality.

For further information see the AIHW website <www.aihw.gov.au>

The AIHW is responsible for undertaking the data management, analysis and reporting of information collected from the Northern Territory outreach ear and hearing health services funded by the Australian Government Department of Health.

Data collection forms are completed by clinical service providers and forwarded to the AIHW via the Northern Territory Department of Health (NT DoH). The NT DoH is responsible for delivering health and family services related to the ministerial responsibilities of Health and Senior Territorians. For further information see the NT DoH website <www.health.nt.gov.au>.

Timeliness

This section specifies the timeliness of the supply of data for this collection, in terms of the time taken for the AIHW to receive and process data from service providers, as well as the time taken for the AIHW to publish data from the end of a reporting period.

The first report on the SFNT audiology data collection was published in January 2014, with a reference period of July 2012 to June 2013. The scope of this report was only the SFNT program (that is, children and young people aged under 16). The scope of subsequent reports was extended to contain both the SFNT program and the Healthy Ears—Better Hearing, Better Listening programme (children and young people aged 0–21). The second annual report, published in February 2015, has a reference period of July 2012 to June 2014. The third annual report, published in November 2015, has a reference period of July 2012to June 2015. It is expected that future reports will be published on an annual basis.

Due to the nature of the collection process, there is a lag between the date when the service was provided and the date of data receipt by the AIHW. This means that at any point in time, there may be services provided that have not yet been captured in the data collection.

However, the extent to which the number of services and children and young people who received services is under-reported is minimal. From July 2012 to June 2015, the median lag between services being provided and records being entered into AIHW's database was 2 weeks for outreach audiology services.

Accessibility

This section outlines the capacity of data users to identify the availability of relevant information, and to then access it in a convenient and suitable manner.

Reports are published on the AIHW website. They can be downloaded free of charge.

Permission to obtain unpublished data must be sought from NT DoH and the Department of Health via the AIHW. In addition, approvals from relevant ethics committees of the Northern Territory could be required.

Interpretability

This section includes information on the availability of information to help provide insight into the data, to assist with interpretation and usability.

To help stakeholders interpret information about the outreach hearing health programs, reports contain basic information about the programs, relevant definitions, and information about the data contained in the analyses presented. This includes providing information about caveats or aspects that readers should be aware of when interpreting the data.

A copy of the SFNT is available on the website of the Standing Council on Federal Financial Relations <http://www.federalfinancialrelations.gov.au>.

Relevance

This section includes information about how well the data meet the agreed purpose of the data collection in terms of concepts measured and the population represented.

Children and young people who receive outreach audiology services are not a random sample of Indigenous children in the Northern Territory. Although outreach audiology services are available to all Indigenous children and young people aged 21 and under the SFNT program and Healthy Ears—Better Hearing, Better Listening programme, not all eligible children and young people access these services. Therefore, it is important to note that outreach audiology data cannot be generalised beyond the programs contained in the data collection; neither can they be used to determine the prevalence of health conditions among all Indigenous children and young people in the Northern Territory.

Services are targeted at children and young people in most need. In January 2013, NT DoH implemented the use of priority listing categories, so children and young people with poorer ear and hearing health are more likely to receive outreach audiology services.

The data collected from services delivered under the SFNT and the Healthy Ears—Better Hearing, Better Listening programs are a by-product of a clinical process. That is, health professionals who provide outreach audiology services document the results on standard data collection forms, which are then forwarded to the AIHW.

The Northern Territory outreach audiology data collection captures data on children and young people who receive outreach audiology services funded through the SFNT and the

Healthy Ears—Better Hearing, Better Listening programs. Under the SFNT, all Indigenous children in the Northern Territory aged under 16 are eligible for services. In addition, under the Healthy Ears—Better Hearing, Better Listening programme, children and young people aged 0–21 are eligible to receive services (however, the AIHW only have data for those aged up to 20 years). The outreach audiology data collection includes demographic information for children and young people who received services, type and degree of hearing loss (if any), hearing impairment (if any), middle ear conditions (if any), and the requirement for further action.

Accuracy

This section provides information about the degree to which the data correctly describe the phenomenon they were designed to measure.

Health providers use standard forms to record information from outreach audiology services. The forms were developed by NT DoH in consultation with the Department of Health (Australian Government) and AIHW.

The extent of missing data should be taken into account when using and interpreting hearing health data. Where possible, published tables show the percentage of missing data.

To obtain unit record data for the AIHW audiology collection, consent for sharing information must be obtained from the service recipient's parent or guardian. If they do not give consent for it to be used in unit record form, their information cannot be presented by demographic characteristics or referral type, only in aggregated form. The proportion of non-consent data varies over time; however, in general, it is about 1% for children who received outreach audiology services.

In order to protect privacy, personal information is not provided to the AIHW (for example, the child's name). Children can be tracked only by using a Hospital Registration Number (HRN).

Due to the nature of the collection process, there is a lag between the date when the service was provided and the date of data receipt by the AIHW. This means that at any point in time, there may be services provided that have not yet been captured in the data collection. However, the extent to which the number of services and children who received services is under-reported is minimal. From July 2012 to June 2015, the median lag between outreach audiology services being provided and records being entered into AIHW's database was 2 weeks.

Coherence

This section provides information about the internal consistency of a statistical collection, product or release, as well as its comparability with other sources of information, within a broad analytical framework and over time.

The scope of the first annual report on SFNT hearing health services to Indigenous children and young people in the Northern Territory published by the AIHW in January 2014 (for 2012–13) contained services provided under SFNT (that is, for children aged under 16). Following this, 2 annual reports were published by the AIHW in 2015 (in February and November, with data to June 2014 and June 2015 respectively). These reports were wider in scope than the first annual report, containing data from SFNT services as well as services provided under the Healthy Ears—Better Hearing, Better Listening programme to children and young people aged 0–20. Due to differences in the scope of the programs, analyses from the first annual report containing only SFNT program data (for children aged under 16 under) should not be compared with analyses in subsequent annual reports (for children and young people aged 0–20).

Additionally, SFNT outreach audiology services were developed and extended from the outreach audiology services originally funded through the CHCI(CtG) program that ran from August 2007 to June 2012. However, data from CHCI(CtG) should not be compared with data from the SFNT program. The CHCI(CtG) services were provided to Indigenous children in prescribed areas of the Northern Territory and targeted at children who had a referral from their initial Child Health Check. The outreach audiology services provided through the SFNT are available to all Indigenous children in the Northern Territory under aged under 16. The final report from the CHCI(CtG) program, *Northern Territory Emergency Response Child Health Check Initiative—follow-up services for oral and ear health: final report 2007–2012*, was published in 2012 and is available from the AIHW website.

Northern Territory ENT teleotology data collection

Summary of key issues

- Children and young people who receive Ear, Nose and Throat (ENT) teleotology services are not a random sample of Indigenous children and young people in the Northern Territory. Although these services are available to all Indigenous people aged 0–20 in the Northern Territory, not all eligible people access these services. Additionally, these services are more commonly accessed by those in remote areas. Therefore, results of analyses may not be able to be generalised to all Indigenous children and young people in the Northern Territory.
- 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 data that have been collected are a by-product of a clinical process. That is, health professionals who provide services document the results on standard data collection forms, which are then forwarded to the AIHW.

Description

ENT teleotology services are funded through the Healthy Ears—Better Hearing, Better Listening programme. ENT teleotology services were previously funded through the Child Health Check Initiative and Closing the Gap programs (CHCI(CtG)), and this funding arrangement ended in December 2010.

All Indigenous children and young people in the Northern Territory aged 21 and under are eligible for ENT teleotology services. Although nationally all Indigenous children and young people aged 0–21 are eligible to receive these services, the AIHW currently only have data for people aged up to 20 years. The data collection includes demographic information of service recipients, middle ear conditions diagnosed (if any), actions recommended, whether follow-up is required, and the type of surgery recommended (if any). Services are most commonly accessed by children and young people in remote areas, where the high demand for ENT face-to-face consultations is difficult to meet due to a lack of resources.

Institutional environment

This section provides information about the origin of the data collection and the arrangements under which the collection is governed and administered.

The Australian Institute of Health and Welfare (AIHW) is a major national agency set up by the Australian Government under the *Australian Institute of Health and Welfare Act* 1987 to provide reliable, regular and relevant information and statistics on Australia's health and welfare. It is an independent corporate Commonwealth entity established in 1987, governed by a management Board, and accountable to the Australian Parliament through the Health portfolio.

The AIHW aims to improve the health and wellbeing of Australians through better health and welfare information and statistics. It collects and reports information on a wide range of topics and issues, ranging from health and welfare expenditure, hospitals, disease and injury, and mental health, to ageing, homelessness, disability and child protection.

The Institute also plays a role in developing and maintaining national metadata standards. This work contributes to improving the quality and consistency of national health and welfare statistics. The Institute works closely with governments and non-government organisations to achieve greater adherence to these standards in administrative data collections to promote national consistency and comparability of data and reporting.

One of the main functions of the AIHW is to work with the states and territories to improve the quality of administrative data and, where possible, to compile national datasets based on data from each jurisdiction, to analyse these datasets and disseminate information and statistics.

The *Australian Institute of Health and Welfare Act* 1987, in conjunction with compliance to the *Privacy Act* 1988, (Cth) ensures that the data collections managed by the AIHW are kept securely and under the strictest conditions with respect to privacy and confidentiality.

For further information see the AIHW website <www.aihw.gov.au>

The AIHW is responsible for undertaking the data management, analysis and reporting of information collected from the Northern Territory outreach ear and hearing health services funded by the Australian Government Department of Health.

Data collection forms are completed by clinical service providers and forwarded to the AIHW via the Northern Territory Department of Health (NT DoH). The NT DoH is responsible for delivering health and family services related to the ministerial responsibilities of Health and Senior Territorians. For further information see the NT DoH website <www.health.nt.gov.au>.

Timeliness

This section specifies the timeliness of the supply of data for this collection, in terms of the time taken for the AIHW to receive and process data from service providers, as well as the time taken for the AIHW to publish data from the end of a reporting period.

The first AIHW report containing ENT service data was published in 2011, with a reference period of July 2009 to May 2011. It covered ENT services funded by the CHCI(CtG) as well as by the Project Agreement on Improving Ear Health Services for Indigenous Australian Children. A report was also published in 2012, with a reference period of July 2009 to December 2010, which covered ENT services funded by the

CHCI(CtG) only. The first report that includes ENT data from services funded by the Healthy Ears—Better Hearing, Better Listening programme from July 2012 to June 2014 was published in February 2015. The second annual report containing ENT data from services funded by the Healthy Ears—Better Hearing, Better Listening programme was published in November 2015, covering data from July 2012 to June 2015. It is expected that future reports will be published on an annual basis.

Due to the nature of the collection process, there is a lag between the date when the service was provided and the date of data receipt by the AIHW. This means that at any point in time, there could be services provided that have not yet been captured in the ENT teleotology data collection. From July 2012 to June 2015, the median lag between ENT teleotology services being provided and records being entered into AIHW's database was about 11 weeks.

Accessibility

This section outlines the capacity of data users to identify the availability of relevant information, and to then access it in a convenient and suitable manner.

Hearing health reports containing ENT teleotology data are published on the AIHW website. They can be downloaded free of charge.

Permission to obtain unpublished data must be sought from NT DoH and the Department of Health via the AIHW. In addition, approvals from relevant ethics committees of the Northern Territory could be required.

Interpretability

This section includes information on the availability of information to help provide insight into the data, to assist with interpretation and usability.

To help stakeholders interpret information about the ENT teleotology services, the AIHW's hearing health reports contain basic information about ENT teleotology services, relevant definitions, and information about the data contained in the analyses presented. This includes providing information about caveats or aspects that readers should be aware of when interpreting the data.

Relevance

This section includes information about how well the data meet the agreed purpose of the data collection in terms of concepts measured and the population represented.

The ENT teleotology collection captures data on children and young people who receive ENT teleotology services funded through the Healthy Ears—Better Hearing, Better Listening programme. ENT teleotology data cannot be generalised beyond the program for a number of reasons; neither can they be used to determine the prevalence of health conditions among all Indigenous children and young people in the Northern Territory. There are several reasons for this:

- People who receive ENT teleotology services are not a random sample of Indigenous children and young people in the Northern Territory. Although services are available to all Indigenous children and young people aged 21 or younger, not all eligible children and young people access these services.

- ENT teleotology services are more commonly accessed by children and young people in remote areas.
- Services are targeted at children and young people most in need. In 2013, Northern Territory DoH implemented the use of priority listing categories, so children and young people with poorer ear and hearing health are more likely to receive ENT teleotology services.
- The methods of assessment used in ENT teleotology services differ from those used for face-to-face consultations. Therefore, the results of tests and subsequent diagnoses from teleotology services may be affected by the method of service delivery.

The data collected from ENT teleotology services delivered under the Healthy Ears—Better Hearing, Better Listening programme are a by-product of a clinical process. That is, health professionals who provide ENT teleotology services document the results on standard data collection forms, which are then forwarded to the AIHW.

Accuracy

This section provides information about the degree to which the data correctly describe the phenomenon they were designed to measure.

Health providers use standard forms to record information on ENT teleotology services. The forms were developed by NT DoH in consultation with the Australian Government Department of Health and the AIHW.

The extent of missing data should be taken into account when using and interpreting ENT teleotology data. Where possible, published tables show the percentage of missing data.

To obtain unit record data for the Northern Territory ENT teleotology data collection, consent for sharing information must be obtained from the service recipient's parent or guardian. If they do not give consent for it to be used in unit record form, their information cannot be presented by demographic characteristics or referral type, only in aggregated form. The proportion of non-consented data varies over time; however, in general, it is around 1% for children and young people who received ENT teleotology services.

In order to protect privacy, personal information is not provided to the AIHW (for example, the child's name). Service recipients can be tracked only by using a Hospital Registration Number (HRN).

Due to the nature of the collection process, there is a lag between the date when the service was provided and the date of data receipt by the AIHW. This means that at any point in time, there could be services provided that have not yet been captured in the ENT teleotology data collection. From July 2012 to June 2015, the median lag between ENT teleotology services being provided and records being entered into the AIHW's database was about 11 weeks.

Coherence

This section provides information about the internal consistency of a statistical collection, product or release, as well as its comparability with other sources of information, within a broad analytical framework and over time.

ENT teleotology services were originally funded through the CHCI(CtG) program that ran from August 2007 to June 2012. Data from the CHCI(CtG) should not be compared with data from July 2012 onwards. The CHCI(CtG) services were provided to Indigenous children and young people aged under 16 in prescribed areas of the Northern Territory and targeted at children and young people who had a referral from their initial Northern Territory Emergency Response Child Health Check. The ENT services provided through the Healthy Ears—Better Hearing, Better Listening programme are available to all Indigenous children and young people in the Northern Territory aged 0–21.

In 2013, priority listing was implemented, so those in most need of ENT services are more likely to receive them before other children and young people. The final report from the CHCI(CtG) program, *Northern Territory Emergency Response Child Health Check Initiative—follow-up services for oral and ear health: final report 2007–2012*, was published in 2012 and is available on the AIHW website.

Northern Territory Child Hearing Health Coordinator data collection

Summary of key issues

- Children who receive Child Hearing Health Coordinator (CHHC) services are not a random sample of Indigenous children in the Northern Territory. The CHHC program is available only to Indigenous children who have a referral from a health professional.
- The data collected as part of the outreach hearing health programs are a by-product of a clinical process. That is, health professionals who provide services document the results on standard data collection forms, which are then forwarded to the AIHW.
- The extent of missing data should be taken into account when using and interpreting hearing health data. Where possible, published tables show the percentage of missing data.
- Rates of non-consent were high over the course of the CHHC program between July 2012 and June 2015 (47% of services and 52% of children). However, there have been improvements to non-consent rates over time, decreasing from 62% of children in 2012–13 to 58% in 2013–14 and 25% in 2014–15. This should be taken into account when interpreting CHHC program analyses.

Description

The CHHC data collection contains data from CHHC services provided in the Northern Territory, funded by the Australian Government through the National Partnership Agreement on Stronger Futures in the Northern Territory (SFNT).

The SFNT began in July 2012 and provides funding to 2021–22. The hearing health component of this agreement replaced, and expanded upon, services implemented under the Northern Territory Emergency Response Child Health Check Initiative and the Closing the Gap in the Northern Territory National Partnership Agreement (CHCI(CtG)). The funding was mainly used to provide CHHC services to children and young people aged under 16.

Institutional environment

This section provides information about the origin of the data collection and the arrangements under which the collection is governed and administered.

The Australian Institute of Health and Welfare (AIHW) is a major national agency set up by the Australian Government under the *Australian Institute of Health and Welfare Act* 1987 to provide reliable, regular and relevant information and statistics on Australia's health and welfare. It is an independent corporate Commonwealth entity established in 1987, governed by a management Board, and accountable to the Australian Parliament through the Health portfolio.

The AIHW aims to improve the health and wellbeing of Australians through better health and welfare information and statistics. It collects and reports information on a wide range of topics and issues, ranging from health and welfare expenditure, hospitals, disease and injury, and mental health, to ageing, homelessness, disability and child protection.

The Institute also plays a role in developing and maintaining national metadata standards. This work contributes to improving the quality and consistency of national health and welfare statistics. The Institute works closely with governments and non-government organisations to achieve greater adherence to these standards in administrative data collections to promote national consistency and comparability of data and reporting.

One of the main functions of the AIHW is to work with the states and territories to improve the quality of administrative data and, where possible, to compile national datasets based on data from each jurisdiction, to analyse these datasets and disseminate information and statistics.

The *Australian Institute of Health and Welfare Act* 1987, in conjunction with compliance to the *Privacy Act* 1988, (Cth) ensures that the data collections managed by the AIHW are kept securely and under the strictest conditions with respect to privacy and confidentiality.

For further information see the AIHW website <www.aihw.gov.au>

The AIHW is responsible for undertaking the data management, analysis and reporting of information collected from the Northern Territory outreach ear and hearing health services funded by the Australian Government Department of Health.

Data collection forms are completed by clinical service providers and forwarded to the AIHW via the Northern Territory Department of Health (NT DoH). The NT DoH is responsible for delivering health and family services related to the ministerial responsibilities of Health and Senior Territorians. For further information see the NT DoH website <www.health.nt.gov.au>.

Timeliness

This section specifies the timeliness of the supply of data for this collection, in terms of the time taken for the AIHW to receive and process data from service providers, as well as the time taken for the AIHW to publish data from the end of a reporting period.

The first report on the SFNT audiology data collection was published in January 2014, with a reference period of July 2012 to June 2013. The scope of this report was only the SFNT program (that is, children and young people aged under 16). The scope of subsequent reports was extended to contain both the SFNT program and the Healthy Ears—Better Hearing, Better Listening programme (children and young people aged 0–21). The second annual report, published in February 2015, has a reference period of July 2012 to June 2014. The third annual report, published in November 2015, has a reference period of July 2012 to June 2015. It is expected that future reports will be published on an annual basis.

Due to the nature of the collection process, there is a lag between the date when the service was provided and the date of data receipt by the AIHW. This means that at any point in time, there may be services provided that have not yet been captured in the data collection. However, the extent to which the number of services and children who received services is under-reported is minimal. From July 2012 to June 2015, the median lag between services being provided and records being entered into AIHW's database was just over 2 weeks for CHHC services.

Accessibility

This section outlines the capacity of data users to identify the availability of relevant information, and to then access it in a convenient and suitable manner.

Reports are published on the AIHW website. They can be downloaded free of charge.

Permission to obtain unpublished data must be sought from NT DoH and the Department of Health via the AIHW. In addition, approvals from relevant ethics committees of the Northern Territory could be required.

Interpretability

This section includes information on the availability of information to help provide insight into the data, to assist with interpretation and usability.

To help stakeholders interpret information about the outreach hearing health programs, reports contain basic information about the programs, relevant definitions, and information about the data contained in the analyses presented. This includes providing information about caveats or aspects that readers should be aware of when interpreting the data.

A copy of the SFNT is available on the website of the Standing Council on Federal Financial Relations <http://www.federalfinancialrelations.gov.au>.

Relevance

This section includes information about how well the data meet the agreed purpose of the data collection in terms of concepts measured and the population represented.

Children who receive outreach CHHC services are not a random sample of Indigenous children in the Northern Territory as these services are available only to Indigenous children who have a referral from a health professional. Therefore, CHHC data cannot be generalised beyond the program; neither can they be used to determine the prevalence of health conditions among all Indigenous children in the Northern Territory.

Services are targeted at children in most need. Priority listing is used for CHHC services, so that children with poorer ear and hearing health are more likely to receive services.

The data collected from services delivered under the SFNT are a by-product of a clinical process. That is, health professionals who provide CHHC services document the results on standard data collection forms, which are then forwarded to the AIHW.

The CHHC data collection captures data on children who participated in the CHHC program. Indigenous children are referred to this program if they have an identified middle ear condition or hearing impairment. The CHHC collection includes demographic information for children who received services, and data on ear health (results of otoscopy and tympanometry), middle ear conditions (if any), clinical services provided, and contact with other service providers.

Accuracy

This section provides information about the degree to which the data correctly describe the phenomenon they were designed to measure.

Health providers use standard forms to record information from the CHHC services. The forms were developed by NT DoH in consultation with the Australian Government Department of Health and AIHW.

The extent of missing data should be taken into account when using and interpreting CHHC data. Where possible, published tables show the percentage of missing data.

To obtain unit record data for the AIHW CHHC collection, consent for sharing information must be obtained from the child's parent or guardian. If they do not give consent for it to be used in unit record form, their information cannot be presented by demographic characteristics or referral type, only in aggregated form. Rates of non-consent were high over the course of the CHHC program between July 2012 and June 2015 (47% of services and 52% of children). This should be taken into account when interpreting CHHC program analyses, as the findings may not accurately represent all children who received CHHC services. However, there have been improvements to non-consent rates over time, decreasing from 62% of children in 2012–13 to 58% in 2013–14 and 25% in 2014–15.

In order to protect privacy, personal information is not provided to the AIHW (for example, the child's name). Children can be tracked only by using a Hospital Registration Number (HRN).

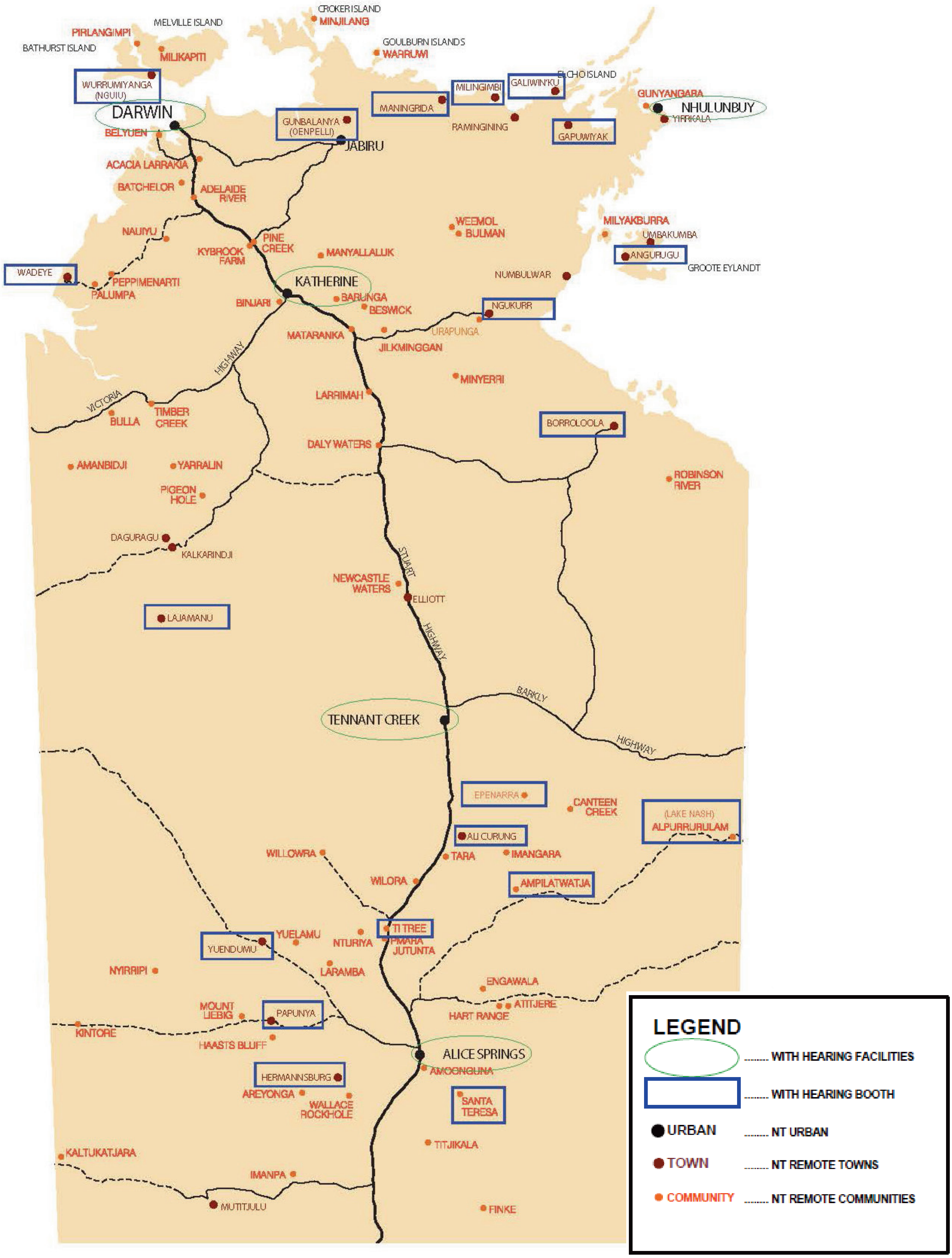
Due to the nature of the collection process, there is a lag between the date when the service was provided and the date of data receipt by the AIHW. This means that at any point in time, there could be services provided that have not yet been captured in the data collection. However, the extent to which the number of services and children who received services is under-reported is minimal. From July 2012 to June 2015, the median lag between services being provided and records being entered into AIHW's database was just over 2 weeks.

Coherence

This section provides information about the internal consistency of a statistical collection, product or release, as well as its comparability with other sources of information, within a broad analytical framework and over time.

Following the AIHW's publication of *Stronger Futures in the Northern Territory: hearing health services 2012–13* in January 2014, the AIHW received additional data on CHHC services provided in 2012–13—in particular, the AIHW received information about a high number of services for which consent to share data with the AIHW was not obtained. Consequently, the total number of CHHC services and service recipients reported for 2012–13 is much higher in the updated reports published in February 2015 and November 2015 than in the report *Stronger Futures in the Northern Territory: hearing health services 2012–13*. Due to differences in the CHHC data analysed, comparisons should not be made between these reports on CHHC services and service recipients. It should be noted that there have been improvements to non-consent rates over time, decreasing from 62% of children in 2012–13 to 58% in 2013–14 and 25% in 2014–15.

Appendix C: Hearing facility locations in the Northern Territory



Appendix D: Comparison of hearing impairment standards

Table D4.1: Comparison of standards for classifying degree of hearing impairment between the Northern Territory Department of Health and the World Health Organization

Degree of hearing impairment	NT DoH standard (for services analysed in this report) (dB HL)	World Health Organization standard (dB HL)
Mild	16–30	26–40
Moderate	31–60	41–60
Severe	61–90	61–80
Profound	91+	81+

Note: Decibel hearing level (dB HL) refers to the quietest sounds that people can hear with their better ear in soundproof conditions.

Appendix E: Additional tables

Table E4.1: Children and young people who received outreach audiology services, by age and sex, 2012–13 to 2014–15

Age and sex	2012–13 Number	2012–13 Per cent	2013–14 Number	2013–14 Per cent	2014–15 Number	2014–15 Per cent	Cumulative total[a] Number	Cumulative total[a] Per cent
Age (years)								
<1	26	1.6	29	1.7	30	1.3	58	1.3
1–2	204	12.4	187	10.7	246	10.3	409	9.4
3–5	420	25.5	448	25.6	560	23.3	991	22.7
6–10	595	36.1	591	33.8	857	35.7	1,563	35.8
11–15	288	17.5	354	20.3	518	21.6	974	22.3
16–20	113	6.9	138	7.9	189	7.9	376	8.6
Sex								
Male	819	49.8	863	49.4	1,208	50.3	2,208	50.5
Female	827	50.2	884	50.6	1,192	49.7	2,163	49.5
Total	**1,646**	**100.0**	**1,747**	**100.0**	**2,400**	**100.0**	**4,371**	**100.0**

(a) Total includes all children and young people who received audiology services from 1 July 2012 to 30 June 2015. It does not equal the sum of services for the financial years, as data are based on the latest service in the period analysed, and children and young people may have received services in multiple financial years.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E4.2: Hearing status[a][b] by age, children and young people who received outreach audiology services, 2012–13 to 2014–15

Age group	Total number of service recipients	Number of service recipients with hearing loss	Per cent of service recipients with hearing loss
2012–13			
<1	26	12	46.2
1–2	204	88	43.1
3–5	420	232	55.2
6–10	595	307	51.6
11–15	288	144	50.0
16–20	113	67	59.3
Total	**1,646**	**850**	**51.6**

(continued)

Table E4.2 (continued): Hearing status[(a)(b)] by age, children and young people who received outreach audiology services, 2012–13 to 2014–15

Age group	Total number of service recipients	Number of service recipients with hearing loss	Per cent of service recipients with hearing loss
2013–14			
<1	29	9	31.0
1–2	187	89	47.6
3–5	448	258	57.6
6–10	591	344	58.2
11–15	354	174	49.2
16–20	138	85	61.6
Total	**1,747**	**959**	**54.9**
2014–15			
<1	30	7	23.3
1–2	246	107	43.5
3–5	560	309	55.2
6–10	857	378	44.1
11–15	518	221	42.7
16–20	189	88	46.6
Total	**2,400**	**1,110**	**46.3**
Cumulative total(c)			
<1	58	15	25.9
1–2	409	186	45.5
3–5	991	516	52.1
6–10	1,563	670	42.9
11–15	974	398	40.9
16–20	376	188	50.0
Total	**4,371**	**1,973**	**45.1**

(a) If a child or young person received multiple audiology services, information is from latest service.

(b) Hearing status is based on the child or young person's better ear. Therefore, degree of hearing loss is reported only for those who may have bilateral hearing loss.

(c) Total includes all children and young people who received audiology services from 1 July 2012 to 30 June 2015. It does not equal the sum of services for the financial years, as data are based on the latest service in the period analysed, and children and young people may have received services in multiple financial years.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015.

Table E4.3: Type of hearing loss[a], children and young people who received outreach audiology services, 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[b]	
Type of hearing loss	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Service recipients with hearing loss	850	51.6	959	54.9	1,110	46.3	1,973	45.1
Conductive	658	40.0	645	36.9	792	33.0	1,399	32.0
Sensorineural	18	1.1	24	1.4	21	0.9	47	1.1
Mixed	28	1.7	21	1.2	10	0.4	34	0.8
Type of hearing loss missing/not tested	146	8.9	269	15.4	287	12.0	493	11.3
No hearing loss	588	35.7	618	35.4	1,062	44.3	2,016	46.1
Hearing loss missing[c]/not tested[d]	208	12.6	170	9.7	228	9.5	382	8.7
Total	**1,646**	**100.0**	**1,747**	**100.0**	**2,400**	**100.0**	**4,371**	**100.0**

(a) If a child or young person received multiple audiology services, information is from latest service.

(b) Total includes all children and young people who received audiology services from 1 July 2012 to 30 June 2015. It does not equal the sum of services for the financial years, as data are based on the latest service in the period analysed, and children and young people may have received services in multiple financial years.

(c) Missing includes not stated, unsure and invalid responses.

(d) Some children and young people may not be tested because they may find it difficult to cooperate with the procedure.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E4.4: Degree of hearing impairment[(a)], children and young people who received outreach audiology services, 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[(b)]	
Degree of hearing impairment	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Service recipients with hearing impairment	537	32.6	582	33.3	692	28.8	1,220	27.9
Mild	374	22.7	408	23.4	491	20.5	870	19.9
Moderate	156	9.5	167	9.6	197	8.2	338	7.7
Severe/profound	7	0.4	7	0.4	4	0.2	12	0.3
No hearing impairment	896	54.4	985	56.4	1,477	61.5	2,760	63.1
Missing[(c)]/Not tested[(d)]	213	12.9	180	10.3	231	9.6	391	8.9
Total	**1,646**	**100.0**	**1,747**	**100.0**	**2,400**	**100.0**	**4,371**	**100.0**

(a) Hearing impairment is based on the child or young person's better ear. Therefore, degree of hearing impairment is reported only for those children and young people who may have bilateral hearing loss. If a child or young person received multiple audiology services, information is from the latest service.

(b) Total includes all children and young people who received audiology services from 1 July 2012 to 30 June 2015. It does not equal the sum of services for the financial years, as data are based on the latest service in the period analysed, and children and young people may have received services in multiple financial years.

(c) Missing includes not stated, unsure and invalid responses.

(d) Children and young people may not be tested if they find it difficult to co-operate with the procedure.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E4.5: Degree of hearing impairment[(a)(b)], by age, children and young people who received outreach audiology services, 2012–13 to 2014–15

		Hearing impairment							
		No hearing impairment		Mild		Moderate/severe/ profound		Missing/ not tested[(c)]	
Age group	**Number of service recipients**	**No.**	**Per cent**	**No.**	**Per cent**	**No.**	**Per cent**	**No.**	**Per cent**
2012–13									
<1	26	5	19.2	3	11.5	6	23.1	12	46.2
1–2	204	31	15.2	35	17.2	42	20.6	96	47.1
3–5	420	178	42.4	115	27.4	55	13.1	72	17.1
6–10	595	403	67.7	141	23.7	33	5.5	18	3.0
11–15	288	206	71.5	52	18.1	19	6.6	11	3.8
16–20	113	73	64.6	28	24.8	8	7.1	4	3.5
Total	**1,646**	**896**	**54.4**	**374**	**22.7**	**163**	**9.9**	**213**	**12.9**

(continued)

Table E4.5 (continued): Degree of hearing impairment[(a)(b)], by age, children and young people who received outreach audiology services, 2012–13 to 2014–15

		Hearing impairment							
		No hearing impairment		Mild		Moderate/severe/profound		Missing/not tested[(c)]	
Age group	Number of service recipients	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
2013–14									
<1	29	5	17.2	4	13.8	2	6.9	18	62.1
1–2	187	28	15.0	34	18.2	40	21.4	85	45.5
3–5	448	217	48.4	129	28.8	46	10.3	56	12.5
6–10	591	375	63.5	150	25.4	52	8.8	14	2.4
11–15	354	269	76.0	68	19.2	12	3.4	5	1.4
16–20	138	91	65.9	23	16.7	22	15.9	2	1.4
Total	**1,747**	**985**	**56.4**	**408**	**23.4**	**174**	**10.0**	**180**	**10.3**
2014–15									
<1	30	2	6.7	3	10.0	2	6.7	23	76.7
1–2	246	34	13.8	54	22.0	45	18.3	113	45.9
3–5	560	272	48.6	152	27.1	66	11.8	70	12.5
6–10	857	619	72.2	174	20.3	51	6.0	13	1.5
11–15	518	400	77.2	80	15.4	27	5.2	11	2.1
16–20	189	150	79.4	28	14.8	10	5.3	1	0.5
Total	**2,400**	**1,477**	**61.5**	**491**	**20.5**	**201**	**8.4**	**231**	**9.6**
Cumulative total[(d)]									
<1	58	10	17.2	3	5.2	6	10.3	39	67.2
1–2	409	65	15.9	84	20.5	84	20.5	176	43.0
3–5	991	501	50.6	265	26.7	104	10.5	121	12.2
6–10	1,563	1,144	73.2	309	19.8	84	5.4	26	1.7
11–15	974	763	78.3	145	14.9	44	4.5	22	2.3
16–20	376	277	73.7	64	17.0	28	7.4	7	1.9
Total	**4,371**	**2,760**	**63.1**	**870**	**19.9**	**350**	**8.0**	**391**	**8.9**

(a) If a child or young person received multiple audiology services, information is from latest service.

(b) Hearing impairment is based on the service recipient's better ear. Therefore, degree of hearing impairment is only reported or those who may have bilateral hearing loss.

(c) Missing includes not stated, unsure and invalid responses.

(d) Total includes all children and young people who received audiology services from 1 July 2012 to 30 June 2015. It does not equal the sum of services for the financial years, as data are based on the latest service in the period analysed, and children and young people may have received services in multiple financial years.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E4.6: Type of actions required, children and young people who received outreach audiology services, 2012–13 to 2014–15

	No hearing loss		Hearing loss		Missing[(a)]		Total	
Type of further action required	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
2012–13								
At least one further action required[(b)]	170	28.9	825	97.1	194	93.3	1,189	72.2
Ongoing monitoring by Northern Territory hearing health service	138	23.5	723	85.1	176	84.6	1,037	63.0
Case management by Primary Health Centre	37	6.3	280	32.9	82	39.4	399	24.2
Case management by ENT	46	7.8	417	49.1	43	20.7	506	30.7
Referral to Department of Education Employment & Training	1	0.2	68	8.0	1	0.5	70	4.3
Referral to Australian Hearing	—	—	111	13.1	7	3.4	118	7.2
Other	4	0.7	28	3.3	6	2.9	38	2.3
No action required	418	71.1	21	2.5	13	6.3	452	27.5
Total service recipients	**588**	**100.0**	**850**	**100.0**	**208**	**100.0**	**1,646**	**100.0**
2013–14								
At least one further action required[(b)]	153	24.8	901	94.0	156	91.8	1,210	69.3
Ongoing monitoring by Northern Territory hearing health service	126	20.4	751	78.3	147	86.5	1,024	58.6
Case management by Primary Health Centre	37	6.0	214	22.3	42	24.7	293	16.8
Case management by ENT	29	4.7	243	25.3	26	15.3	298	17.1
Referral to Department of Education Employment & Training	2	0.3	77	8.0	6	3.5	85	4.9
Referral to Australian Hearing	1	0.2	125	13.0	8	4.7	134	7.7
Other	3	0.5	14	1.5	—	—	17	1.0
No action required	465	75.2	47	4.9	11	6.5	523	29.9
Total service recipients	**618**	**100.0**	**959**	**100.0**	**170**	**100.0**	**1,747**	**100.0**
2014–15								
At least one further action required[(b)]	200	18.8	1,071	96.5	201	88.2	1,472	61.3
Ongoing monitoring by Northern Territory hearing health service	175	16.5	968	87.2	189	82.9	1,332	55.5
Case management by Primary Health Centre	30	2.8	264	23.8	56	24.6	350	14.6
Case management by ENT	29	2.7	264	23.8	27	11.8	320	13.3
Referral to Department of Education Employment & Training	—	0.2	172	15.5	1	0.4	175	7.3

(continued)

Table E4.6 (continued): Type of actions required, children and young people who received outreach audiology services, 2012–13 to 2014–15

	No hearing loss		Hearing loss		Missing[(a)]		Total	
Type of further action required	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Referral to Australian Hearing	—	0.1	282	25.4	14	6.1	297	12.4
Other	8	0.8	38	3.4	8	3.5	54	2.3
No action required	863	81.3	34	3.1	27	11.8	924	38.5
Total service recipients	**1,062**	**100.0**	**1,110**	**100.0**	**228**	**100.0**	**2,400**	**100.0**
Cumulative total[(c)]								
At least one further action required[(b)]	379	18.8	1,875	95.0	339	88.7	2,593	59.3
Ongoing monitoring by Northern Territory hearing health service	314	15.6	1,641	83.2	312	81.7	2,267	51.9
Case management by Primary Health Centre	78	3.9	473	24.0	101	26.4	652	14.9
Case management by ENT	73	3.6	525	26.6	47	12.3	645	14.8
Referral to Department of Education Employment & Training	3	0.1	231	11.7	6	1.6	240	5.5
Referral to Australian Hearing	1	0.0	392	19.9	25	6.5	418	9.6
Other	12	0.6	61	3.1	8	2.1	81	1.9
No action required	1,638	81.3	91	4.6	40	10.5	1,769	40.5
Total service recipients	**2,016**	**100.0**	**1,973**	**100.0**	**382**	**100.0**	**4,371**	**100.0**

(a) Missing includes not tested, not stated, unsure and invalid responses.

(b) Children can have multiple further actions required and, therefore, the sum of these categories totals more than 100%.

(c) Total includes all children and young people who received audiology services from 1 July 2012 to 30 June 2015. It does not equal the sum of services for the financial years, as data are based on the latest service in the period analysed, and children and young people may have received services in multiple financial years.

Notes

1. Data are reported only where consent was obtained.
2. If a child or young person received multiple audiology services, information is from the latest service.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E4.7: Change in hearing status, children and young people who received at least 2 outreach audiology services(a), July 2012 to June 2015

	First SFNT audiology service		Last SFNT audiology service			
Hearing loss status	Number	Per cent (x)	Number	Per cent (y)	Per cent change (y–x)÷x(b)	Percentage point difference (y–x)(c)
Hearing loss(d)	984	79.5	733	59.3	–25.5	–20.3
Unilateral	315	25.5	250	20.2	–20.6	–5.3
Bilateral	669	54.1	483	39.0	–27.8	–15.0
No hearing loss	253	20.5	504	40.7	99.2	20.3
Total(e)	**1,237**	**100.0**	**1,237**	**100.0**	. .	. .

(a) Median time between first and second service: 14 months. Minimum time interval: 3 months.

(b) The change in a variable from one period to another, expressed as a percentage of its value in the first period (that is, proportion at the last service minus proportion at the first service, divided by proportion at the first service).

(c) The difference between the percentages at two time periods (that is, proportion at the last service minus proportion at the first service).

(d) Total children and young people with unilateral and bilateral hearing loss.

(e) Indigenous children and young people who received 2 or more outreach audiology services. Excludes children and young people with missing or not tested responses for hearing status.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E4.8: Change in hearing loss status, children and young people who received at least 3 outreach audiology services(a)(b), cohort study, August 2007 to June 2015

	Change in hearing loss status				
Age group	Improved(c)	Stabilised(d)	Fluctuated(e)	Deteriorated(f)	Total
		Number			
0–5	292	176	140	54	662
6–10	242	162	118	60	582
11–15	61	49	47	29	186
Total	**595**	**387**	**305**	**143**	**1,430**
		Per cent			
0–5	44.1	26.6	21.1	8.2	100.0
6–10	41.6	27.8	20.3	10.3	100.0
11–15	32.8	26.3	25.3	15.6	100.0
Total	**41.6**	**27.1**	**21.3**	**10.0**	**100.0**

(continued)

Table E4.8 (continued): Change in hearing loss status, children and young people who received at least 3 outreach audiology services[(a)][(b)], cohort study, August 2007 to June 2015

(a) Median interval between the first and second last service: 25 months. Median interval between second last and last service: 12 months. Minimum interval between services: 3 months.

(b) Excludes service recipients with missing or not tested hearing loss status.

(c) Hearing loss status was classified as 'improved' if a child or young person's hearing loss status improved between services included for analysis in this study (between the first and second services and/or between the second and third services); if there was an improvement between only 2 services, there was no change in hearing loss status between the other 2 services. Improved hearing loss status was defined as a change between audiology services in the following scenarios: (1) From bilateral hearing loss to unilateral hearing loss or no hearing loss; (2) From unilateral hearing loss to no hearing loss.

(d) Hearing loss status was classified as 'stabilised' if a child or young person's hearing loss status was the same in all 3 audiology services included for analysis in this study.

(e) Hearing loss status was classified as 'fluctuated' if a child or young person's hearing loss status differed between services included for analysis in this study without a clear pattern in either improvement or deterioration (that is, if hearing loss status improved between first and second services and deteriorated between second and third services, or vice versa).

(f) Hearing loss status was classified as 'deteriorated' if a child or young person's hearing loss status deteriorated between services included for analysis in this study (between the first and second services and/or between the second and third services); if there was a deterioration between only 2 services, there was no change in hearing loss status between the other 2 services. Deteriorated hearing loss status was defined as a change between audiology services in the following scenarios: (1) From no hearing loss to unilateral hearing loss/ bilateral hearing loss; (2) From unilateral hearing loss to bilateral hearing loss.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E4.9: Proportion of children and young people with hearing loss at first outreach audiology service, second last service and last service (among those who received 3 or more services), by age, August 2007 to June 2015

		First service		Second last service		Last service	
Age group	**Total service recipients**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
0–5	662	571	86.3	481	72.7	365	55.1
6–10	582	483	83.0	404	69.4	313	53.8
11–15	186	156	83.9	147	79.0	123	66.1
Total	**1,430**	**1,210**	**84.6**	**1,032**	**72.2**	**801**	**56.0**

Notes

1. Median interval between the first and second last service: 25 months. Median interval between second last and last service: 12 months. Minimum interval between services: 3 months.
2. Includes Indigenous children and young people who received 3 or more outreach audiology services. Excludes children and young people with missing or not tested responses for hearing loss status.
3. Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E4.10: Change in hearing impairment status, children and young people who received at least 3 outreach audiology services[(a)(b)], cohort study, August 2007 to June 2015

	Change in hearing impairment status				
Age (years)	**Improved**[(c)]	**Stabilised**[(d)]	**Fluctuated**[(e)]	**Deteriorated**[(f)]	**Total**
		Number			
0–5	304	150	77	120	651
6–10	194	228	63	100	585
11–15	50	71	20	43	184
Total	**548**	**449**	**160**	**263**	**1,420**
		Per cent			
0–5	46.7	23.0	11.8	18.4	100.0
6–10	33.2	39.0	10.8	17.1	100.0
11–15	27.2	38.6	10.9	23.4	100.0
Total	**38.6**	**31.6**	**11.3**	**18.5**	**100.0**

(a) Median interval between the first and second last service: 25 months. Median interval between second last and last service: 13 months. Minimum interval between services: 3 months.

(b) Excludes service recipients with missing or not tested hearing impairment.

(c) Hearing impairment status was classified as ‘improved’ if a child or young person’s hearing impairment status improved between services included for analysis in this study (between first and second services and/or between second and third services); if there was an improvement between only 2 services, there was no change in hearing impairment status between the other 2 services. Improved hearing impairment status was defined as a movement between audiology services to a lower degree of hearing impairment (for example, from profound hearing impairment to severe, moderate or mild hearing impairment).

(d) Hearing impairment status was classified as ‘stabilised’ if a child or young person’s hearing impairment status was the same in all 3 audiology services included for analysis in this study.

(e) Hearing impairment status was classified as ‘fluctuated’ if a child or young person’s hearing impairment status differed between services included for analysis in this study without a clear pattern in either improvement or deterioration (that is, if hearing impairment status improved between first and second services and deteriorated between second and third services, or vice versa).

(f) Hearing impairment status was classified as ‘deteriorated’ if a child or young person’s hearing impairment status deteriorated between services included for analysis in this study (between first and second services and/or between second and third services); if there was a deterioration between only 2 services, there was no change in hearing impairment status between the other 2 services. Deteriorated hearing impairment status was defined as a movement between audiology services to a higher degree of hearing impairment (for example, from mild hearing impairment to moderate, severe or profound hearing impairment).

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E4.11: Proportion of children and young people with hearing impairment at first outreach audiology service, second last service and last service (among those who received 3 or more services), by age, August 2007 to June 2015

	First service		Second last service		Last service	
Hearing impairment	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Age 0–5						
None	196	30.1	345	53.0	428	65.7
Mild	256	39.3	227	34.9	165	25.3
Moderate/severe/profound	199	30.6	79	12.1	58	8.9
Total	**651**	**100.0**	**651**	**100.0**	**651**	**100.0**
Age 6–10						
None	298	50.9	370	63.2	414	70.8
Mild	189	32.3	164	28.0	135	23.1
Moderate/severe/profound	98	16.8	51	8.7	36	6.2
Total	**585**	**100.0**	**585**	**100.0**	**585**	**100.0**
Age 11–15						
None	98	53.3	117	63.6	118	64.1
Mild	49	26.6	46	25.0	48	26.1
Moderate/severe/profound	37	20.1	21	11.4	18	9.8
Total	**184**	**100.0**	**184**	**100.0**	**184**	**100.0**
Total (age 0–15)						
None	592	41.7	832	58.6	960	67.6
Mild	494	34.8	437	30.8	348	24.5
Moderate/severe/profound	334	23.5	151	10.6	112	7.9
Total	**1,420**	**100.0**	**1,420**	**100.0**	**1,420**	**100.0**

Notes

1. Median interval between the first and second last service: 25 months. Median interval between second last and last service: 13 months. Minimum interval between services: 3 months.
2. Includes Indigenous children and young people who received 3 or more outreach audiology services, aged 0–20. Excludes those with missing or not tested responses for hearing impairment.
3. Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E5.1: Number of children and young people who received an ENT service, by age and sex, 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[(a)]	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Age[(b)]								
0–5	163	22.5	206	24.6	221	25.9	429	23.2
6–10	309	42.7	337	40.3	321	37.6	717	38.8
11–15	174	24.1	208	24.9	216	25.3	492	26.6
16–20	77	10.7	86	10.3	96	11.2	210	11.4
Sex								
Male	337	46.6	386	46.1	413	48.4	902	48.8
Female	386	53.4	451	53.9	441	51.6	946	51.2
Total	**723**	**100.0**	**837**	**100.0**	**854**	**100.0**	**1,848**	**100.0**

(a) Total includes all children and young people who received ENT services (1 July 2012 to 30 June 2015). It does not equal the sum of the services for financial years, as data are based on the latest service in the period analysed, and children and young people may have received services in multiple financial years.

(b) Age based on latest ENT service received

Notes

1. Data are reported only where consent was obtained.
2. Services include only those provided through the ENT program.

Source: AIHW analysis of ENT teleotology data collection (services provided on or before 30 June 2015.

Table E5.2: Type of actions recommended at ENT teleotology services, 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[(a)]	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Treatment recommended								
Medication	195	27.0	232	27.7	197	23.1	413	22.3
Foreign body removed	3	0.4	8	1.0	2	0.2	10	0.5
Aural toilet	72	10.0	100	11.9	85	10.0	167	9.0
Other treatment	1	0.1	11	1.3	1	0.1	8	0.4
Total who had at least one type of treatment recommended[(b)]	**203**	**28.1**	**251**	**30.0**	**204**	**23.9**	**438**	**23.7**
Surgery recommended								
Myringoplasty	161	22.3	188	22.5	183	21.4	372	20.1
Myringotomy	31	4.3	28	3.3	22	2.6	49	2.7
Adenoidectomy	35	4.8	43	5.1	45	5.3	81	4.4

(continued)

Table E5.2 (continued): Type of actions recommended at ENT teleotology services, 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[(a)]	
	Number	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Grommets	10	1.4	13	1.6	44	5.2	54	2.9
Examination under anaesthetic (EUA)	7	1.0	12	1.4	8	0.9	18	1.0
Exploration of middle ear/ mastoid	—	—	—	—	2	0.2	2	0.1
Removal of tubes	1	0.1	2	0.2	2	0.2	3	0.2
Other procedure	3	0.4	1	0.1	2	0.2	4	0.2
Total who had at least one surgery recommended[(b)]	**210**	**29.0**	**236**	**28.2**	**252**	**29.5**	**484**	**26.2**
Further follow-up recommended								
Case management by primary health-care services	10	1.4	19	2.3	14	1.6	30	1.6
Audiological assessment	457	63.2	635	75.9	537	62.9	1,223	66.2
Australian Hearing	11	1.5	21	2.5	19	2.2	38	2.1
ENT review	345	47.7	546	65.2	496	58.1	1,063	57.5
Total who had at least one type of follow-up recommended[(b)]	**500**	**69.2**	**674**	**80.5**	**603**	**70.6**	**1,338**	**72.4**
All actions recommended (treatment, surgery and further follow-up)								
Total who had at least one action recommended[(b)]	608	84.1	748	89.4	701	82.1	1,521	82.3
Total service recipients	**723**	**100.0**	**837**	**100.0**	**854**	**100.0**	**1,848**	**100.0**

(a) Total includes all children and young people who received ENT services between 1 July 2012 and 30 June 2015. It does not equal the sum of services for the financial years, as data are based on the latest service in the period analysed, and children and young people may have received services in multiple financial years.

(b) This is a multiple-response item. The subtotal does not add up to the sum of the categories because service recipients may be recommended for more than 1 type of action.

Notes

1. Data are reported only where consent was obtained.
2. Services include only those provided through the ENT program.

Source: AIHW analysis of ENT teleotology data collection (services provided on or before 30 June 2015).

Table E6.1: Number of Indigenous children in the CHHC program, by sex and hearing health priority category, 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[(a)]	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Sex								
Male	90	46.4	144	50.3	214	51.8	389	50.7
Female	104	53.6	142	49.7	199	48.2	379	49.3
Priority listing[(b)]								
HP1	16	8.2	22	7.7	22	5.3	60	7.8
HP2	59	30.4	88	30.8	116	28.1	224	29.2
HP3	88	45.4	131	45.8	189	45.8	336	43.8
HP4	29	14.9	45	15.7	86	20.8	146	19.0
Total	**194**	**100.0**	**286**	**100.0**	**413**	**100.0**	**768**	**100.0**

(a) Total includes all children who received CHHC services from 1 July 2012 to 30 June 2015. It does not equal the sum of services for the financial years, as data are based on the first service in the period analysed, and children may have received services in mutltiple financial years.

(b) Hearing health priority listing status at first visit. See Box 6.1 for definitions of categories.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2015).

Table E6.2: Type of clinical services provided at CHHC visits, 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[(a)]	
Clinical services	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Discussed ear health education	193	96.0	302	98.1	418	96.8	913	97.0
Verified diagnosis	171	85.1	282	91.6	332	76.9	785	83.4
Discussed hearing loss strategies	157	78.1	273	88.6	313	72.5	743	79.0
Supported audiological management	151	75.1	270	87.7	319	73.8	740	78.6
Confirmed regular follow-up & care plan	157	78.1	226	73.4	283	65.5	666	70.8
Discussed treatment adherence strategies	111	55.2	174	56.5	235	54.4	520	55.3
Verified or amended treatment	93	46.3	153	49.7	185	42.8	431	45.8
Supported ENT management	66	32.8	131	42.5	150	34.7	347	36.9
Total visits[(b)]	**201**	**100.0**	**308**	**100.0**	**432**	**100.0**	**941**	**100.0**

(a) Total includes all CHHC services from 1 July 2012 to 30 June 2015.

(b) Children can be provided with multiple services; therefore, the columns may sum to more than 100%.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2015).

Table E6.3: Contact made with other service providers at CHHC visits, 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[(a)]	
Service providers	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Health providers	103	51.2	203	65.9	287	66.4	593	63.0
Education providers	77	38.3	183	59.4	206	47.7	466	49.5
Australian Hearing	20	10.0	62	20.1	58	13.4	140	14.9
Community–based workers	12	6.0	53	17.2	53	12.3	118	12.5
Other services	3	1.5	4	1.3	9	2.1	16	1.7
Total visits[(b)]	**201**	**100.0**	**308**	**100.0**	**432**	**100.0**	**941**	**100.0**

(a) Total includes all CHHC services from 1 July 2012 to 30 June 2015.

(b) Children can be provided with multiple services; therefore, the columns may sum to more than 100%.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2015).

Table E6.4: Type of ear condition, children in the CHHC program who received CHHC services, 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[(b)]	
Type of ear condition[(a)]	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
At least one type of ear condition	*188*	*96.9*	*259*	*90.6*	*363*	*87.9*	*697*	*90.8*
OME	77	39.7	143	50.0	175	42.4	329	42.8
ETD	14	7.2	36	12.6	48	11.6	85	11.1
CSOM with discharge	45	23.2	60	21.0	83	20.1	162	21.1
CSOM without discharge	29	14.9	28	9.8	61	14.8	94	12.2
AOM	41	21.1	40	14.0	48	11.6	117	15.2
AOM with perforation	21	10.8	10	3.5	11	2.7	38	4.9
Other	35	18.0	30	10.5	53	12.8	107	13.9
No ear condition[(c)]	6	3.1	27	9.4	46	11.1	67	8.7
Total children[(d)]	**194**	**100.0**	**286**	**100.0**	**413**	**100.0**	**768**	**100.0**

(a) Ear condition at first visit.

(b) Total includes all children who received CHHC services from 1 July 2012 to 30 June 2015. It does not equal the sum of the services for financial years, as children may have received services in multiple financial years.

(c) No ear condition reported for both ears.

(d) Children can be provided with multiple services; therefore, the columns may sum to more than 100%.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2015).

Table E6.5: Hearing loss status[(a)], children in the CHHC and audiology programs[(b)], 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[(c)]	
Hearing loss status	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Hearing loss[(d)]	109	77.3	171	75.7	198	73.9	478	75.3
Unilateral	23	16.3	28	12.4	35	13.1	86	13.5
Bilateral	86	61.0	143	63.3	163	60.8	392	61.7
No hearing loss	32	22.7	55	24.3	70	26.1	157	24.7
Total children	**141**	**100.0**	**226**	**100.0**	**268**	**100.0**	**635**	**100.0**

(a) Based on hearing status at last audiology service.

(b) Children who received both CHHC and audiology services.

(c) Total includes all children who received CHHC services from 1 July 2012 to 30 June 2015. It does not equal the sum of services for the financial years, as children may have received services in multiple financial years.

(d) Total children with unilateral and bilateral hearing loss.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2015).

Table E6.6: Degree of hearing impairment[(a)], children in the CHHC and audiology programs[(b)], 2012–13 to 2014–15

	2012–13		2013–14		2014–15		Cumulative total[(c)]	
Degree of hearing impairment	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
No hearing impairment	25	17.7	31	13.7	42	15.7	98	15.4
Hearing impairment	82	58.2	140	61.9	151	56.3	373	58.7
Mild	57	40.4	82	36.3	98	36.6	237	37.3
Moderate/severe/profound	25	17.7	58	25.7	53	19.8	136	21.4
Missing[(d)]	2	1.4	—	—	5	1.9	7	1.1
Total children with hearing loss	109	77.3	171	75.7	198	73.9	478	75.3
Children without hearing loss	32	22.7	55	24.3	70	26.1	157	24.7
Total children tested for hearing loss[(e)]	**141**	**100.0**	**226**	**100.0**	**268**	**100.0**	**635**	**100.0**

(a) Based on hearing status at last audiology service.

(b) Children who received both CHHC and audiology services.

(c) Total includes all children who received CHHC services from July 2012 to 30 June 2015. It does not equal the sum of services for the financial years, as children may have received services in multiple financial years.

(d) Missing includes not stated, unsure, invalid and not tested responses.

(e) Some children may not be tested because they may find it difficult to cooperate with the procedure.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2015).

Table E7.1: Type of ear condition[(a)], children and young people[(b)] who received an audiology or ENT service, by sex, 2012–13 to 2014–15

	Sex					
	Male		Female		Total	
Type of ear condition	Number	Per cent	Number	Per cent	Number	Per cent
2012–13						
At least one type of ear condition	*255*	*58.6*	*225*	*52.2*	*480*	*55.4*
OME	85	19.5	73	16.9	158	18.2
ETD	72	16.6	56	13.0	128	14.8
CSOM with discharge	33	7.6	33	7.7	66	7.6
CSOM without discharge	37	8.5	44	10.2	81	9.4
AOM	24	5.5	21	4.9	45	5.2
Foreign body/other	63	14.5	57	13.2	120	13.9
No ear condition[(c)]	180	41.4	206	47.8	386	44.6
Total who received an ENT or audiology service	**435**	**100.0**	**431**	**100.0**	**866**	**100.0**
2013–14						
At least one type of ear condition	*339*	*58.4*	*336*	*60.3*	*675*	*59.4*
OME	121	20.9	101	18.1	222	19.5
ETD	90	15.5	75	13.5	165	14.5
CSOM with discharge	65	11.2	67	12.0	132	11.6
CSOM without discharge	52	9.0	51	9.2	103	9.1
AOM	27	4.7	26	4.7	53	4.7
Foreign body/other	58	10.0	93	16.7	151	13.3
No ear condition[(c)]	241	41.6	221	39.7	462	40.6
Total who received an ENT or audiology service	**580**	**100.0**	**557**	**100.0**	**1,137**	**100.0**
2014–15						
At least one type of ear condition	*765*	*63.2*	*767*	*63.9*	*1,532*	*63.6*
OME	285	23.6	289	24.1	574	23.8
ETD	177	14.6	176	14.7	353	14.6
CSOM with discharge	129	10.7	123	10.3	252	10.5
CSOM without discharge	149	12.3	161	13.4	310	12.9
AOM	67	5.5	59	4.9	126	5.2
Foreign body/other	160	13.2	145	12.1	305	12.7

(continued)

Table E7.1 (continued): Type of ear condition[(a)], children and young people[(b)] who received an audiology or ENT service, by sex, 2012–13 to 2014–15

	Sex					
	Male		Female		Total	
Type of ear condition	Number	Per cent	Number	Per cent	Number	Per cent
No ear condition(c)	445	36.8	433	36.1	878	36.4
Total who received an ENT or audiology service	**1,210**	**100.0**	**1,200**	**100.0**	**2,410**	**100.0**
Cumulative total(d)						
At least one type of ear condition	*1,359*	*61.1*	*1,328*	*60.7*	*2,687*	*60.9*
OME	491	22.1	463	21.2	954	21.6
ETD	339	15.2	307	14.0	646	14.6
CSOM with discharge	227	10.2	223	10.2	450	10.2
CSOM without discharge	238	10.7	256	11.7	494	11.2
AOM	118	5.3	106	4.8	224	5.1
Foreign body/other	281	12.6	295	13.5	576	13.1
No ear condition(c)	866	38.9	860	39.3	1,726	39.1
Total who received an ENT or audiology service	**2,225**	**100.0**	**2,188**	**100.0**	**4,413**	**100.0**

(a) Compiled using linked ENT teleotology and audiology data collections based on HRN. Uses ear condition diagnosed at most recent ENT service or, if only received audiology service, most recent audiology service. If the most recent ENT and audiology service was on the same date, diagnosis of ear condition at ENT consultation was used.

(b) Excludes children and young people with an unknown or invalid HRN.

(c) No ear condition was reported in both right and left ears.

(d) Total includes children and young people who received services between July 2012 and June 2014

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology and ENT teleotology data collections (services provided on or before 30 June 2015).

Table E7.2: Type of ear condition[a], children and young people[b] who received an audiology or ENT service, by age, 2012–13 to 2014–15

	Age group (years)											
	0–2		3–5		6–10		11–15		16–20		Total	
Type of ear condition	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
2012–13												
At least one type of ear condition	*74*	*75.5*	*122*	*71.3*	*161*	*49.8*	*83*	*43.0*	*40*	*49.4*	*480*	*55.4*
OME	35	35.7	50	29.2	56	17.3	12	6.2	5	6.2	158	18.2
ETD	8	8.2	38	22.2	56	17.3	21	10.9	5	6.2	128	14.8
CSOM with discharge	11	11.2	16	9.4	23	7.1	10	5.2	6	7.4	66	7.6
CSOM without discharge	4	4.1	11	6.4	28	8.7	21	10.9	17	21.0	81	9.4
AOM	18	18.4	15	8.8	6	1.9	5	2.6	1	1.2	45	5.2
Foreign body/other	15	15.3	27	15.8	29	9.0	28	14.5	21	25.9	120	13.9
No ear condition[c]	24	24.5	49	28.7	162	50.2	110	57.0	41	50.6	386	44.6
Total who received an ENT or audiology service	**98**	**100.0**	**171**	**100.0**	**323**	**100.0**	**193**	**100.0**	**81**	**100.0**	**866**	**100.0**
2013–14												
At least one type of ear condition	*70*	*70.0*	*171*	*64.8*	*229*	*58.6*	*142*	*52.2*	*63*	*57.3*	*675*	*59.4*
OME	37	37.0	71	26.9	70	17.9	34	12.5	10	9.1	222	19.5
ETD	15	15.0	55	20.8	60	15.3	30	11.0	5	4.5	165	14.5
CSOM with discharge	9	9.0	28	10.6	48	12.3	26	9.6	21	19.1	132	11.6
CSOM without discharge	4	4.0	13	4.9	37	9.5	32	11.8	17	15.5	103	9.1
AOM	22	22.0	12	4.5	9	2.3	6	2.2	4	3.6	53	4.7

(continued)

Table E7.2 (continued): Type of ear condition[(a)], children and young people[(b)] who received an audiology or ENT service, by age, 2012–13 to 2014–15

	Age group (years)											
	0–2		3–5		6–10		11–15		16–20		Total	
Type of ear condition	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Foreign body/other	5	5.0	26	9.8	53	13.6	47	17.3	20	18.2	151	13.3
No ear condition[(c)]	30	30.0	93	35.2	162	41.4	130	47.8	47	42.7	462	40.6
Total who received an ENT or audiology service	**100**	**100.0**	**264**	**100.0**	**391**	**100.0**	**272**	**100.0**	**110**	**100.0**	**1,137**	**100.0**
2014–15												
At least one type of ear condition	*202*	*73.2*	*408*	*72.7*	*519*	*60.1*	*295*	*56.9*	*108*	*56.5*	*1,532*	*63.6*
OME	119	43.1	185	33.0	193	22.3	62	12.0	15	7.9	574	23.8
ETD	35	12.7	108	19.3	143	16.6	56	10.8	11	5.8	353	14.6
CSOM with discharge	28	10.1	72	12.8	81	9.4	55	10.6	16	8.4	252	10.5
CSOM without discharge	19	6.9	56	10.0	104	12.0	88	17.0	43	22.5	310	12.9
AOM	40	14.5	41	7.3	33	3.8	11	2.1	1	0.5	126	5.2
Foreign body/other	22	8.0	46	8.2	103	11.9	90	17.4	44	23.0	305	12.7
No ear condition[(c)]	74	26.8	153	27.3	345	39.9	223	43.1	83	43.5	878	36.4
Total who received an ENT or audiology service	**276**	**100.0**	**561**	**100.0**	**864**	**100.0**	**518**	**100.0**	**191**	**100.0**	**2,410**	**100.0**
Cumulative total[(d)]												
At least one type of ear condition	*346*	*73.0*	*701*	*70.4*	*909*	*57.6*	*520*	*52.9*	*211*	*55.2*	*2,687*	*60.9*
OME	191	40.3	306	30.7	319	20.2	108	11.0	30	7.9	954	21.6

(continued)

Table E7.2 (continued): Type of ear condition[(a)], children and young people[(b)] who received an audiology or ENT service, by age, 2012–13 to 2014–15

	Age group (years)											
	0–2		3–5		6–10		11–15		16–20		Total	
Type of ear condition	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
ETD	58	12.2	201	20.2	259	16.4	107	10.9	21	5.5	646	14.6
CSOM with discharge	48	10.1	116	11.6	152	9.6	91	9.3	43	11.3	450	10.2
CSOM without discharge	27	5.7	80	8.0	169	10.7	141	14.3	77	20.2	494	11.2
AOM	80	16.9	68	6.8	48	3.0	22	2.2	6	1.6	224	5.1
Foreign body/other	42	8.9	99	9.9	185	11.7	165	16.8	85	22.3	576	13.1
No ear condition(c)	128	27.0	295	29.6	669	42.4	463	47.1	171	44.8	1,726	39.1
Total who received an ENT or audiology service	**474**	**100.0**	**996**	**100.0**	**1,578**	**100.0**	**983**	**100.0**	**382**	**100.0**	**4,413**	**100.0**

(a) Compiled using linked ENT teleotology and audiology data collections based on HRN. Uses ear condition diagnosed at most recent ENT service or, if only received audiology service, most recent audiology service. If the most recent ENT and audiology service was on the same date, diagnosis of ear condition at ENT consultation was used.

(b) Excludes children and young people with an unknown or invalid HRN.

(c) No ear condition reported for both right and left ears.

(d) Total includes children and young people who received services between July 2012 and June 2014.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology and ENT teleolotogy data collections (services provided on or before 30 June 2015.

Table E7.3: Hearing loss status by ear condition[(a)], children and young people who received an audiology or ENT service, 2012-13 to 2014-15[(b)]

		Hearing loss status				
Type of ear condition	No hearing loss	Bilateral	Unilateral	Sub-total of hearing loss	Missing[(c)(d)]	Total
2012–13						
At least one type of ear condition	*27.9*	*34.2*	*18.8*	*52.9*	*19.2*	*100.0*
OME	13.3	48.1	15.2	63.3	23.4	100.0
ETD	53.1	18.0	17.2	35.2	11.7	100.0
CSOM with discharge	6.1	56.1	16.7	72.7	21.2	100.0
CSOM without discharge	18.5	33.3	38.3	71.6	9.9	100.0
AOM	6.7	42.2	13.3	55.6	37.8	100.0
Foreign body/other[(e)]	32.5	25.0	20.0	45.0	22.5	100.0
No ear condition[(f)]	80.1	6.0	3.9	9.8	10.1	100.0
Total service recipients[(g)]	**51.2**	**21.6**	**12.1**	**33.7**	**15.1**	**100.0**
2013–14						
At least one type of ear condition	*23.9*	*43.6*	*23.1*	*66.7*	*9.5*	*100.0*
OME	11.3	57.7	17.6	75.2	13.5	100.0
ETD	44.8	26.7	18.8	45.5	9.7	100.0
CSOM with discharge	6.8	60.6	25.8	86.4	6.8	100.0
CSOM without discharge	9.7	54.4	34.0	88.3	1.9	100.0
AOM	9.4	49.1	13.2	62.3	28.3	100.0
Foreign body/other[(e)]	37.7	33.8	23.2	57.0	5.3	100.0
No ear condition[(f)]	76.0	10.0	4.8	14.7	9.3	100.0
Total service recipients[(g)]	**45.0**	**29.9**	**15.7**	**45.6**	**9.4**	**100.0**
2014–15						
At least one type of ear condition	*24.4*	*43.2*	*22.0*	*65.2*	*10.4*	*100.0*
OME	9.2	61.5	18.8	80.3	10.5	100.0
ETD	43.6	27.2	19.8	47.0	9.3	100.0
CSOM with discharge	6.3	59.5	21.8	81.3	12.3	100.0
CSOM without discharge	15.8	46.1	31.6	77.7	6.5	100.0

(continued)

Table E7.3 (continued): Hearing loss status by ear condition[(a)], children and young people who received an audiology or ENT service, 2012-13 to 2014-15[(b)]

	Hearing loss status					
Type of ear condition	**No hearing loss**	**Bilateral**	**Unilateral**	**Sub-total of hearing loss**	**Missing**[(c)(d)]	**Total**
AOM	4.8	50.8	18.3	69.0	26.2	100.0
Foreign body/other[(e)]	43.9	28.5	20.3	48.9	7.2	100.0
No ear condition[(f)]	78.7	8.5	4.1	12.6	8.7	100.0
Total service recipients[(g)]	**44.2**	**30.6**	**15.5**	**46.1**	**9.8**	**100.0**
Cumulative total[(h)]						
At least one type of ear condition	*24.9*	*41.7*	*21.7*	*63.4*	*11.7*	*100.0*
OME	10.4	58.4	17.9	76.3	13.3	100.0
ETD	45.8	25.2	19.0	44.3	9.9	100.0
CSOM with discharge	6.4	59.3	22.2	81.6	12.0	100.0
CSOM without discharge	15.0	45.7	33.2	78.9	6.1	100.0
AOM	6.3	48.7	16.1	64.7	29.0	100.0
Foreign body/other[(e)]	39.9	29.2	21.0	50.2	9.9	100.0
No ear condition[(f)]	78.3	8.3	4.2	12.6	9.2	100.0
Total service recipients[(g)]	**45.8**	**28.6**	**14.9**	**43.5**	**10.7**	**100.0**

(a) Compiled using linked ENT teleotology and audiology data collections based on HRN. Uses ear condition diagnosed at most recent ENT service or, if only received audiology service, most recent audiology service. If most recent ENT and audiology service was on the same date, diagnosis of ear condition at ENT consultation was used.

(b) Excludes children and young people with an unknown or invalid HRN.

(c) Missing includes not stated, unsure, invalid and not tested responses.

(d) As hearing loss status was derived from audiology data, where a child or young person received only an ENT service (that is, no audiology service received), then hearing loss status was coded as missing.

(e) 'Other' includes grommets, reduced ear drum movement or retracted ear drum, or other ear condition.

(f) Where no ear condition reported for both ears.

(g) Total children and young people who received an ENT or audiology service.

(h) Total includes children and young people who received services between July 2012 and June 2015.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology and ENT teleotology data collections (services provided on or before 30 June 2015).

Table E7.4: Degree of hearing impairment by ear condition[(a)], children and young people who received an audiology or ENT service, 2012–13 to 2014–15[(b)] (per cent)

	Degree of hearing impairment						
Type of ear condition	No hearing impairment	Mild	Moderate	Severe profound	Sub-total of hearing impairment	Missing[(c)(d)]	Total
2012–13							
At least one type of ear condition	*51.5*	*26.0*	*10.2*	*0.2*	*36.5*	*12.1*	*100.0*
OME	37.3	38.0	12.0	—	50.0	12.7	100.0
ETD	72.7	18.0	3.1	—	21.1	6.3	100.0
CSOM with discharge	25.8	43.9	18.2	—	62.1	12.1	100.0
CSOM without discharge	60.5	27.2	4.9	1.2	33.3	6.2	100.0
AOM	26.7	28.9	22.2	2.2	53.3	20.0	100.0
Foreign body/other[(e)]	55.0	20.0	8.3	—	28.3	16.7	100.0
No ear condition[(f)]	84.7	4.4	1.0	0.3	5.7	9.6	100.0
Total service recipients[(g)]	**66.3**	**16.4**	**6.1**	**0.2**	**22.7**	**11.0**	**100.0**
2013–14							
At least one type of ear condition	*49.2*	*30.7*	*11.4*	*0.7*	*42.8*	*8.0*	*100.0*
OME	30.6	43.2	14.4	1.4	59.0	10.4	100.0
ETD	67.3	22.4	3.0	—	25.5	7.3	100.0
CSOM with discharge	34.1	37.1	20.5	0.8	58.3	7.6	100.0
CSOM without discharge	47.6	35.0	13.6	1.0	49.5	2.9	100.0
AOM	24.5	30.2	20.8	—	50.9	24.5	100.0
Foreign body/other[(e)]	64.2	23.8	6.6	1.3	31.8	4.0	100.0
No ear condition[(f)]	82.3	7.4	1.7	0.2	9.3	8.4	100.0
Total service recipients[(g)]	**62.6**	**21.2**	**7.5**	**0.5**	**29.2**	**8.2**	**100.0**
2014–15							
At least one type of ear condition	*48.8*	*28.6*	*11.9*	*0.2*	*40.7*	*10.5*	*100.0*
OME	31.0	41.6	16.0	0.3	58.0	11.0	100.0
ETD	66.6	22.4	1.7	—	24.1	9.3	100.0

(continued)

Table E7.4 (continued): Degree of hearing impairment by ear condition[(a)], children and young people who received an audiology or ENT service, 2012–13 to 2014–15[(b)] (per cent)

	Degree of hearing impairment						
Type of ear condition	No hearing impairment	Mild	Moderate	Severe profound	Sub-total of hearing impairment	Missing[(c)(d)]	Total
CSOM with discharge	32.1	35.3	20.2	0.4	56.0	11.9	100.0
CSOM without discharge	49.7	30.6	12.6	0.3	43.5	6.8	100.0
AOM	25.4	27.8	19.0	0.8	47.6	27.0	100.0
Foreign body/other[(e)]	65.6	19.3	7.5	—	26.9	7.5	100.0
No ear condition[(f)]	83.6	6.2	1.4	0.1	7.6	8.8	100.0
Total service recipients[(g)]	**61.5**	**20.4**	**8.0**	**0.2**	**28.6**	**9.9**	**100.0**
Cumulative total[(h)]							
At least one type of ear condition	*49.4*	*28.7*	*11.5*	*0.3*	*40.5*	*10.2*	*100.0*
OME	32.0	41.4	15.0	0.5	56.9	11.1	100.0
ETD	68.0	21.5	2.3	—	23.8	8.2	100.0
CSOM with discharge	31.8	37.1	20.0	0.4	57.6	10.7	100.0
CSOM without discharge	51.0	31.0	11.5	0.6	43.1	5.9	100.0
AOM	25.4	28.6	20.1	0.9	49.6	25.0	100.0
Foreign body/other[(e)]	63.0	20.7	7.5	0.3	28.5	8.5	100.0
No ear condition[(f)]	83.5	6.1	1.4	0.2	7.6	8.9	100.0
Total service recipients[(g)]	**62.7**	**19.8**	**7.5**	**0.3**	**27.6**	**9.7**	**100.0**

(a) Compiled using linked ENT teleotology and audiology data collections based on HRN. Uses ear condition diagnosed at most recent ENT service or, if received only audiology service, most recent audiology service. If most recent ENT and audiology service were on the same date, diagnosis of ear condition at ENT consultation was used.

(b) Excludes children and young people with an unknown or invalid HRN.

(c) Missing includes not stated, unsure, invalid and not tested responses.

(d) As hearing loss status was derived from audiology data, where a child or young person received only an ENT service (i.e. no audiology service received), then hearing loss status was coded as missing.

(e) 'Other' includes grommets, reduced ear drum movement or retracted ear drum, or other ear condition.

(f) Where no ear condition reported for both ears.

(g) Total children and young people who received an ENT or audiology service.

(h) Total includes children and young people who received services between July 2012 and June 2015.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology and ENT teleotology data collections (services provided on or before 30 June 2015).

Table E7.5: Change in prevalence of ear conditions between first and last hearing health (ENT or audiology) service[(a)(b)]

	First service		Last service			
Type of ear condition	**Number**	**Per cent (x)**	**Number**	**Per cent (y)**	**Per cent change (y–x)÷x**	**Percentage point difference (y–x)**
At least one type of ear condition	*1,178*	*78.3*	*1,081*	*71.8*	*–8.2*	*–6.4*
Otitis media[(c)]	979	65.0	794	52.8	–18.9	–12.3
OME	453	30.1	385	25.6	–15.0	–4.5
CSOM with discharge	290	19.3	217	14.4	–25.2	–4.9
CSOM without discharge	219	14.6	227	15.1	3.7	0.5
AOM	153	10.2	64	4.3	–58.2	–5.9
ETD	190	12.6	233	15.5	22.6	2.9
Foreign body	21	1.4	11	0.7	–47.6	–0.7
Other[(d)]	151	10.0	216	14.4	43.0	4.3
No ear condition[(e)]	327	21.7	424	28.2	29.7	6.4
Total service recipients[(f)]	**1,505**	**100.0**	**1,505**	**100.0**	. .	. .

(a) Minimum interval between first and last services: 3 months. Median interval: 15 months.

(b) Compiled using linked ENT teleotology and audiology data collections based on HRN. Uses ear condition diagnosed at ENT service or, if received only audiology service, audiology service. If ENT and audiology service were on the same date, diagnosis of ear condition at ENT consultation was used. Excludes children and young people with missing response for middle ear condition.

(c) Otitis media includes OME, CSOM with discharge, CSOM without discharge and AOM.

(d) 'Other' includes grommets, reduced ear drum movement or retracted ear drum, or other ear condition.

(e) Where no ear condition reported for both right and left ears.

(f) The sum of the columns may be greater than 100% as service recipients may have more than one ear condition.

Note: Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology and ENT teleotology data collections (services provided on or before 30 June 2015).

Table E7.6: Children and young people with OME, CSOM with discharge, AOM or CSOM without discharge at first hearing health outreach service, second last service and last service (among those who received 3 or more services), by age, August 2007 to June 2015[(a)(b)(c)]

		First service		Second last service		Last service	
Age group	**Total service recipients**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
0–5	960	735	76.6	625	65.1	502	52.3
6–10	642	518	80.7	401	62.5	321	50.0
11–15	218	183	83.9	151	69.3	131	60.1
Total	**1,820**	**1,436**	**78.9**	**1,177**	**64.7**	**954**	**52.4**

(continued)

Table E7.6 (continued): Children and young people with OME, CSOM with discharge, AOM or CSOM without discharge at first hearing health outreach service, second last service and last service (among those who received 3 or more services), by age, August 2007 to June 2015[a][b][c]

(a) Median interval between the first and second service: 25 months. Median interval between the second and last service: 12 months. Minimum interval: 3 months.

(b) Includes Indigenous children and young people who received 3 or more outreach audiology or ENT teleotology services with a minimum time interval between first and last service of 3 months.

(c) Compiled using linked ENT teleotology and audiology data collections based on HRN. Uses middle ear condition diagnosed at ENT service or, if received only audiology service, audiology service. If ENT and audiology service were on the same date, diagnosis of middle ear condition at ENT consultation was used. Excludes children and young people with missing response for middle ear condition.

Note: Data are reported only for for services where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology and ENT teleotology data collections (services provided on or before 30 June 2015).

Table E7.7: Progress of children and young people with ear conditions between initial[a] and last service, August 2007 to June 2015

	Condition at initial service[a]			
	CSOM with discharge		CSOM without discharge	
Condition at last service	**Number**	**Per cent**	**Number**	**Per cent**
CSOM with discharge	197	32.7	148	19.7
CSOM without discharge	179	29.7	254	33.8
OME	37	6.1	50	6.7
AOM	18	3.0	10	1.3
Other conditions	42	7.0	58	7.7
No ear condition[b]	141	23.4	244	32.5
Unsure	11	1.8	10	1.3
Total[c]	**602**	**100.0**	**751**	**100.0**

(a) 'Initial service' refers to the initial service at which a child or young person was diagnosed with CSOM with discharge or CSOM without discharge, which is not necessarily the service recipient's first audiology or ENT service.

(b) No ear condition reported for both right and left ears.

(c) The total may be greater than 100% as service recipients may have more than one ear condition.

Notes

1. Minimum time between initial and last services: 3 months. Median time interval: 37 months. Maximum time interval: 87 months.
2. For the last service, if children and young people received 2 services on the same day (that is, 1 ENT and 1 audiology service), the ENT diagnosis was selected for analysis.
3. Data are reported only where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology and ENT teleolotogy data collections (services provided between 1 August 2007 and 30 June 2015).

Table E8.1: Number of audiology checks among children and young people who received SFNT audiology services, 2012–13 to 2014–15

Year	Number of audiology checks	Target
2012–13	1,815	1,700
2013–14	1,971	1,700
2014–15	2,699	1,700

Note: Services include only those that were provided through the SFNT program.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E8.2: Number of children who received services from hearing health coordinators, 2012–13 to 2014–15

Year	Number of children	Target
2012–13	504	700
2013–14	675	700
2014–15	550	700

Note: Services include only those that were provided through the SFNT program.

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2015).

Table E8.3: Progress towards 2014–15 targets for hearing impairment, CSOM with discharge, and CSOM without discharge among children and young people who received SFNT audiology services, 2012–13 to 2014–15

	Outcomes (%)			
	2012–13	2013–14	2014–15	Target for 2014–15
Service recipients with moderate and severe conductive hearing impairment				
All ages	10.1	9.4	8.6	<=11%
Service recipients with CSOM with discharge				
0–5 years	5.9	5.3	4.7	<=15%
6–15 years	7.4	9.0	6.1	<=12%
Service recipients with CSOM without discharge				
0–5 years	3.5	2.9	3.6	<=9%
6–15 years	8.5	8.1	8.9	<=18%

Note: Services include only those that were provided through the SFNT program.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Table E8.4: Progress towards 2014–15 target for improved hearing among children and young people who received SFNT audiology services, 2012–13, 2012–14 and 2012–15(a)

	Proportion of service recipients with improved hearing(b)			
	2012–13	2012–14	2012–15	Target for 2014–15(c)
0–5 years	40.4	45.3	49.7	>=46%
6–15 years	58.1	58.5	58.6	>=55%

(a) Children and young people in this analysis include those who received 2 or more SFNT audiology services in the periods specified (which are cumulative from June 2012).

(b) Defined as a movement to a less severe hearing impairment category, for example, from moderate to mild.

(c) This is the target to be achieved within the 2014–15 financial year (that is, by 30 June 2015) for services provided cumulatively from July 2012 to June 2015.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2015).

Glossary

acute otitis media: 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 one 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.

adenoidectomy: Surgical removal of adenoids.

audiometry/ pure tone audiometry: The standard technique of testing hearing ability. Pure tone audiometry records a subjective response to threshold (softest) sound stimuli presented through headphone, bone conductor or speaker at discrete frequencies essential to detect and discriminate speech. Any response deviation from the normal range, at any sound stimuli, in either ear, is described as a hearing loss and the type of hearing loss is diagnosed.

aural toilet: A procedure where an ear, nose and throat surgeon 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 with discharge: A persistent suppurative discharge from the middle ear through a tympanic membrane 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 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 supperative otitis media. Also known as dry perforation.

conductive hearing loss: Describes 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).

eustachian tube dysfunction: Negative middle ear pressure associated with compromised equalisation impeding middle ear function and sometimes causing middle ear fluid accumulation.

examination under anaesthetic: Examination of a person's ear(s) while under anaesthetic.

grommet: A small tube surgically placed across the eardrum to re-establish ventilation to the middle ear. It is also called '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: 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 one ear (unilateral) or both ears (bilateral).

mild hearing impairment: On average, the quietest sounds that people can hear with their better ear are between 16–30 dB HL in soundproof conditions and 26–35 dB HL in non-soundproof conditions. They are able to hear and repeat words spoken in 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 between 31–60 dB HL in soundproof conditions and 36–60 dB HL in non-soundproof conditions. They 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 (ear drum).

otitis media: All forms if 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 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. They 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 essential.

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 between 61–90 dB HL either in soundproof conditions or non-soundproof conditions. They 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: Describes pus produced in response to inflammatory bacterial infections.

teleotology: Method of offsite service delivery whereby specialists assess middle ear function, diagnose middle ear conditions and recommend further actions and treatment based on information provided to them electronically by an audiologist or an ENT nurse consultant.

tympanometry: An examination to test the condition of the middle ear and mobility of the eardrum and the conduction bones. It is an objective test of middle ear function and provides a measure of energy transmission through the middle ear.

unilateral hearing loss: Hearing loss in one ear.

visual reinforced observation audiometry: A hearing assessment technique (using specialised sound field facilities) that is appropriate for smaller children and babies aged 9–36 months). When able to sit and turn their heads independently, children can be conditioned to repeatedly and reliably respond to frequency specific warble tones, presented via speaker, headphone or bone conductor. This conditioned response is reinforced with a visual reward (puppet) to obtain threshold (softest) measures. Results obtained via speaker (standard test) do not provide separate ear information but determine adequacy of hearing for speech and language development and reflect the better ear.

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List of tables

List of figures

List of boxes

Related publications

The following AIHW publications on CHCI(CtG) and SFNT 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, 2007–2012. 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 Indigenous children and young people in the Northern Territory 2012–13 and 2013–14. Cat. no. IHW 149. Canberra: AIHW.

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

This is the third annual report on hearing health outreach services provided to Aboriginal and Torres Strait Islander children and young people in the Northern Territory, funded by the Australian Government. It reports on outreach audiology, ENT teleotology, and Child Hearing Health Coordinator services provided from July 2012 to June 2015. There is evidence to suggest the effectiveness of these programs in improving ear and hearing health among service recipients—of almost 1,000 children and young people who received multiple outreach audiology services in 2012–15 and who had hearing loss at their first service, one-third had no hearing loss at their most recent service.