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Hearing health outreach services to Indigenous children and young people in the Northern Territory

2012–13 and 2013–14

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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

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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
CSOM	chronic suppurative otitis media
dBHL	decibel hearing level
ENT	ear, nose and throat
ETD	eustachian tube dysfunction
HRN	hospital registration number
Hz	Hertz
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 outreach services funded by the Department of Health and delivered by the Northern Territory Department of Health between July 2012 and June 2014. The main funding sources for these services are the National Partnership Agreement on Stronger Futures in the Northern Territory and the Healthy Ears—Better Hearing, Better Listening program. The report also includes information on hearing health and middle ear conditions among service recipients.

Service delivery

- In 2013–14, 2,122 outreach audiology services were delivered to 1,764 Indigenous children and young people. In total, from July 2012 to June 2014, 4,054 audiology services were delivered to 2,889 children and young people.
- Child Hearing Health Coordinators (CHHCs) conducted 697 visits to 675 children in 2013–14—slightly below the target of 700 children set by the Australian and Northern Territory governments. In total, 1,140 children were seen at 1,208 CHHC visits from July 2012 to June 2014.
- A total of 860 ear, nose and throat (ENT) teleotology services were provided to 766 children and young people in 2013–14. From July 2012 to June 2014, 1,684 ENT teleotology services were provided to 1,283 children and young people.

Hearing health status among children and young people who received services

- Hearing loss was present in 55% of children and young people who received outreach audiology services at their latest service in 2013–14.
- Hearing health status improved for a large proportion of the children and young people who received 2 or more outreach audiology services. Of the 498 children and young people who had hearing loss at their first audiology service, 41% experienced functional improvements in their hearing (with 26% regaining normal hearing capability at their last check, and 15% having their hearing loss status improve from bilateral to unilateral).
- Among 102 children and young people with hearing impairment at their first audiology check, the severity of impairment improved for 50% at their last check, remained at the same level for 40%, and deteriorated for 10%.

Middle ear conditions among children and young people who received services

- In 2013–14, of the 1,791 children and young people who received an audiology or ENT service, 67% were diagnosed with at least 1 type of middle ear condition (an increase from 61% in 2012–13)—most commonly otitis media with effusion (24%).
- Of the 781 children and young people who received 2 or more ENT or audiology services from July 2012 to June 2014, the proportion diagnosed with at least 1 middle ear condition between the first and last service decreased, from 79% to 76%.
- Improvements were seen for those who received 3 or more services since August 2007: the proportion of children and young people diagnosed with at least 1 middle ear condition decreased, from 81% at the first service to 55% at the last service.
- Among those diagnosed with chronic suppurative otitis media with discharge or dry perforation at an initial service, overall, the results suggest poor progress, with the majority of these children and young people still experiencing the same condition or developing another type of ear disease over the course of their treatment.

1 Introduction

This report presents information on ear and hearing health outreach services provided to Indigenous children and young people in the Northern Territory, on their hearing health, and on middle ear conditions that they experience. These 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, mainly through the National Partnership Agreement on Stronger Futures in the Northern Territory (SFNT) (for children aged under 16) and the Healthy Ears—Better Hearing, Better Listening program.

The report focuses on services delivered in 2012–13 and 2013–14. Analyses of changes in hearing status and middle ear conditions over time are mainly over a short-term period (July 2012 to June 2014). However, in some instances, there are also analyses over a longer period (August 2007 to June 2014) for children and young people who received 3 or more audiology or ENT services.

The report provides information on topics that include those listed below:

- How many occasions of service were delivered for each hearing health service, 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 middle ear conditions among children and young people who received audiology and/or ENT teleotology services?
- Is there evidence to suggest the effectiveness of the hearing health programs in the Northern Territory 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 2012–13 and 2013–14?

1.1 Background

It is well known that Indigenous children, particularly in remote communities, suffer extensively from ear and hearing problems. 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 Child Health Check Initiative 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 the CHCI(CtG)[1], evidence from data collected through these programs showed that among children who received ear and hearing health services, the prevalence of middle

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[1] In this report, the Northern Territory Emergency Response Child Health 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).

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 enhance Northern Territory ear and hearing health services in order to continue improving hearing health and to reduce middle ear conditions among Indigenous children in the Northern Territory.

The SFNT began in July 2012 and provides funding over a decade to 2021–22. The hearing health component of this agreement replaced, and expanded upon, services implemented under the CHCI(CtG). The funding was mainly used to provide audiology and CHHC services to children aged 0–15.

In addition, the Northern Territory Government received funds from the Australian Government through the Healthy Ears—Better Hearing, Better Listening program in 2013–14. The funding was mainly used to support audiology services for people aged 16–20 and ENT teleotology services. All Indigenous children and young people aged up to 21 are eligible to receive these services; however, they have mainly been delivered by outreach service teams to children and young people in remote areas, as there is a high demand and a lack of local services in these areas.

Ear and hearing health outreach programs in the Northern Territory

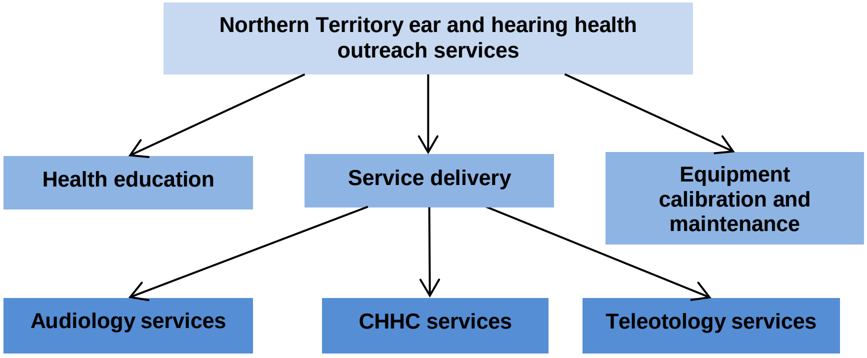
The ear and hearing health outreach programs in the Northern Territory that are included in this report have three components: audiology services, CHHC services and teleotology services. Apart from delivering these services, outreach teams also provide health education and promotion services to the communities they visit. As well, resources are dedicated to maintaining medical equipment to ensure these services run smoothly.

Figure 1.1 illustrates the different components of the hearing health outreach services in the Northern Territory that are included in this report (note that children and young people in the program may access more than 1 type of service). Table 1.1 summarises information about these services, including the scope, service providers and the specific functions of each service type.

Table 1.1: Hearing health outreach services funded by the Australian Government in the Northern Territory[(a)]

Scope	Service provider/staff	Services provided
Audiology services		
Indigenous children and young people in the Northern Territory aged under 21 Services for children aged under 16 are funded through the SFNT Services for children aged 16 to 21 are funded through the Healthy Ears—Better Hearing, Better Listening program.	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 disease • Recommendations for clinical care and rehabilitation (for example, communication strategies, classroom amplification, hearing aids, speech therapy and education support) • Outreach teams work with local families, primary health organisations, community personnel, schools and early childhood organisations.
CHHC services		
Indigenous children who have a priority listing (that is, a diagnosed middle ear condition or documented hearing impairment) See Chapter 4 for more information.	Child hearing health coordinators (currently, there are 7 CHHCs, who manage about 100 children each).	Coordination of treatment strategies by: • facilitating contact with a range of service providers (for example, education or health services, community-based workers and Australian Hearing) • monitoring and assessing ear health status • providing treatment at critical times in the disease process. Services also include hearing health prevention and promotion.
ENT teleotology services		
Indigenous children and young people in the Northern Territory aged under 21.	• Clinical nurse consultant (ENT) • Audiologist • ENT specialist.	• Assessment of middle ear function • Audiological assessment • Diagnosis of middle ear conditions • Recommendations for treatment (for example, medications, surgery).
Ear and hearing health education		
Health, hospital, school and child care staff, trainee Aboriginal health workers, community members.	Hearing health outreach team members, which may 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.

(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.



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

Audiology services

Audiology services are available to all Indigenous children and young people in the Northern Territory under the age of 21. They are delivered by 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. The 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.

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).

CHHC services

CHHC services are provided through the CHHC initiative. These services promote skills and system development in primary health organisations to support population-level otitis media surveillance and to implement early detection, treatment and prevention strategies. The aim of these services is to raise awareness and to advocate for hearing health in communities in the Northern Territory.

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 services with specialist resources. The CHHCs administer clinical services and facilitate contact with a range of service providers, such as education or health services, community-based workers and Australian Hearing. 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 4 for information on priority categories).

This approach was developed in response to the difficulties encountered in treating ear disease in the Northern Territory. Its persistent and recurrent nature, as well as the challenges of delivering services in remote areas, made it a very complicated disease to manage (AIHW 2011). Coordinating treatment strategies helps to ensure continuity of care for children with identified hearing health problems.

ENT teleotology services

Teleotology services form an important part of the integrated end-to-end hearing health system in the Northern Territory in meeting demands for ENT services in remote communities (particularly in relation to post-surgical assessment). Teleotology uses 'store and forward' technology (compared with live or face-to-face consultations) that has shown both cost and productivity benefits, enabling more children and young people across remote areas to access ENT services. Teleotology services involve an audiologist or nurse consultant first collecting relevant case history information and obtaining video-otoscopy digital images during an outreach visit. An ENT specialist consultation is then provided using all available past electronic clinical data and digital otoscopy images. The ENT recommendations are referred to primary health practitioners through the clinical nurse consultant (ENT) and updated in patient information recall systems (Primary Care Information System, and Communicare).

The ENT Department at the Royal Darwin Hospital leads the clinical governance of the delivery of teleotology services. If surgery is deemed appropriate based on teleotological assessment, the child is added to an elective surgery waiting list.

Ear and hearing health education

Hearing health outreach programs in the Northern Territory provide a number of education programs for audiences of various backgrounds. They include health and hospital staff, school and child care staff, trainee Aboriginal health workers, as well as community members. The purpose of education sessions varies. A number of activities are targeted at health and hospital staff on 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.

Hearing Health Information Management System

As a part of the hearing health programs in the Northern Territory, the Hearing Health Information Management System has been developed by the hearing health team in the Northern Territory Department of Health (NT DoH). This system will enable 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 being diagnosed. Once fully established, the system will contain data from a range of services including, but not limited to, hearing health services (for example, it will include data from primary health care providers and hearing rehabilitation services). This will assist with case management and continuity of care for children and young people accessing the services.

The information collected through this system is expected to be included in subsequent editions of this report.

Hearing health facilities

Specialised hearing health facilities are important in providing audiology services, particularly for assessing children aged under 3. In addition, specialised ear and hearing health clinical equipment such as typmanometers and video otoscopes are used in many primary health organisations. Maintenance and annual calibration of ear and hearing health specialist equipment is an important part of the hearing health program. To meet the demand for service delivery and to enable audiological assessment of children aged under 3, 19 audiological facilities have been installed in remote Northern Territory communities. 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 A shows the location of hearing assessment facilities in the Northern Territory.

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 is used to provide a level of accountability for health service delivery for Indigenous children and young people in an area of critical need in the Northern Territory. The data and reporting help to build the evidence required for program monitoring and evaluation.

The data are collected using paper data collection forms. The relevant health professionals responsible for providing services complete a form with information about the child or young person's demographic characteristics, the type(s) of services provided, 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. Descriptions of data items collected and the data collection forms are included at Appendix B.

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

- Hearing health outreach audiology data collection
- ENT teleotology data collection
- Child Hearing Health Coordinator data collection.

The amount of data received by the AIHW for each service and child or young person varies depending on whether the child or young person's family provide consent to share this 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, only 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:

- 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.

- As the AIHW does not receive detailed information on audiology, ENT or CHHC services if parents or guardians do not consent to share the data, the data for which consent has not been obtained are not included in most of the analyses in this report. The accuracy of analysed results for audiology and ENT are 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 2014. On the other hand, rates of non-consent were high for CHHC services (58% of services and 61% of children) between July 2012 and June 2014 (see Chapter 4 for more discussion on this issue). This should be taken into account when interpreting the analyses presented in Chapter 4.
- 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, such as the child's name, is not provided to the AIHW, children and young people can be tracked only by using their hospital registration number (HRN). A very small number of children and young people cannot be tracked due to missing or incorrect HRNs. These are noted in relevant tables.
- 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 and services are targeted at children with high need. Therefore, the findings in this report are not representative of the total Indigenous population aged under 21.
- 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 Report structure

The report is structured as described below:

- **Chapter 2—Preventive interventions and ear health promotion:** includes information about preventive interventions undertaken through the hearing health programs included in this report, such as the resources and education material developed to promote ear health.
- **Chapter 3— 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 4—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 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—Middle ear conditions:** uses combined data from audiology and ENT teleotology services to analyse the prevalence of middle ear conditions among children and young people who received these services, hearing status and impairment among children diagnosed with conditions, and changes over time in the prevalence of middle ear conditions among children and young people who received multiple services.
- **Chapter 7—SFNT audiology performance benchmarks:** includes information about whether the audiology services delivered and outcomes achieved in 2012–13 and 2013–14 reached targets agreed by the Australian and Northern Territory departments of health.

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. Some children and young people, for example, may receive only 1 type of service, while others may move between multiple service types or receive services concurrently.

The data collection forms for audiology, CHHC and ENT teleotology services are provided at Appendix B, and a data quality statement for the collections at Appendix C.

2 Preventive interventions and ear health promotion

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 education activities.

Table 2.1 summarises nine types of education programs that were provided from July 2013 to June 2014, attended by 659 people from different fields. The purpose and target audience of the education sessions varied, with a number of activities targeted at health and hospital staff. For example, training sessions were provided to health and hospital staff on the services and treatment pathways available through different hearing health programs (attended by 91 participants), otitis media treatment and referral pathways (attended by 92), and diagnosis, treatment and management of ear disease (attended by 82).

Education sessions were also provided to school staff on the relationships between ear disease, hearing and school. They were attended by 64 participants, including early childhood teachers, Families as First Teachers workers, Aboriginal education workers, and primary and secondary school teachers.

Ear and hearing health education was provided to 12 trainee Aboriginal health workers, and 34 child care staff. At a community level, education on the impact of hearing loss was provided to community members across the Northern Territory, attended by 172 people.

Table 2.1: Summary of hearing health program education activities, 2013–14

Topic	Target audience	Number of participants
Hearing health program services and pathways	Health and hospital staff	91
Performing otoscopy	Health and hospital staff	36
Tympanometry	Health staff	27
Diagnosis, treatment and management of ear disease	Health and hospital staff	82
Ear disease, hearing and school	School staff	64
Otitis media treatment and referral pathways	Health staff	92
Teleotology, ear disease diagnosis	Health staff	49
Ear and hearing health	Trainee Aboriginal health practitioners	12
	Childcare staff	34
Impact of hearing loss	Community members	172

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 schoolteachers (primary and secondary).

Source: NT DoH, unpublished data.

3 Audiology services

Key findings

- In 2013–14, over 2,120 outreach audiology services were provided, received by over 1,760 Indigenous children and young people in the Northern Territory. This was an increase from about 1,930 services received by about 1,660 children and young people in 2012–13.
- Hearing loss (see Box 3.2) was present in 55% of children and young people who received outreach audiology services at their latest service in 2013–14, which is a slight increase from 52% in 2012–13.
- A total of 34% of children and young people who received services in 2013–14 had some form of hearing impairment (see Box 3.2), and it tended to be more severe in younger age groups.
- Among over 620 children and young people who received 2 or more audiology services between July 2012 and June 2014, there were improvements in hearing health:
  - There was a 17% decrease in the proportion with hearing loss between their first and last services.
  - Among more than 100 children and young people who received 2 or more outreach audiology services and who had a hearing impairment, half experienced an improvement in their degree of hearing impairment.

This chapter focuses on the provision of outreach audiology services to Indigenous children and young people in the Northern Territory, funded by the Australian Government. As mentioned in the introduction of this report, apart from aggregated information on the number of services, data are not provided to the AIHW if parents or guardians do not give consent to share detailed information. As such, for most of this chapter, the analyses are based only on data where consent was provided. Throughout this report, the term ‘services’ refers to occasions of service rather than service providers.

3.1 Audiology data collection

Audiology data are received by the AIHW in paper form from the NT DoH audiology team.

The audiology data include:

- information about the child (HRN, 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 3.2 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.

3.2 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 2013–14, over 2,120 audiology services were provided and were received by about 1,760 children and young people aged under 21 (Table 3.1). This was an increase from 2012–13, in which there were over 1,900 services provided to almost 1,660 children and young people.

From July 2012 to June 2014, about 4,050 services were provided to almost 2,890 children and young people. Consent was provided to share information with the AIHW for almost all children and young people who received audiology services in both years.

Table 3.1: Number of audiology services and children and young people who received services, 2012–13 and 2013–14

	Services			Service recipients		
Year	**Consent**	**Non-consent**	**Total**	**Consent[(a)]**	**Non-consent**	**Total[(a)]**
			Number			
2012–13	1,918	14	1,932	1,645	14	1,659
2013–14	2,101	21	2,122	1,743	21	1,764
Total	**4,019**	**35**	**4,054**	**2,854**	**35**	**2,889**
			Per cent			
2012–13	99.3	0.7	100.0	99.2	0.7	100.0
2013–14	99.0	1.0	100.0	98.8	1.0	100.0
Total	**99.1**	**0.9**	**100.0**	**98.8**	**0.9**	**100.0**

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

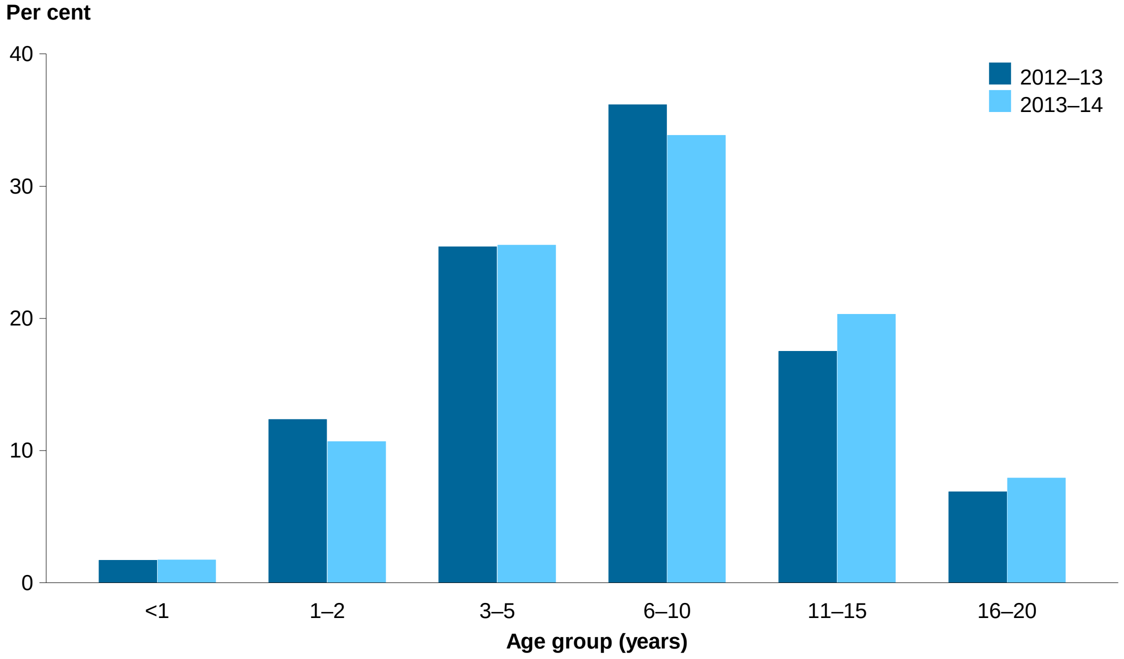
Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Demographic characteristics

In 2013–14, of 1,743 children and young people who received audiology services and for whom consent to share data was obtained, a large proportion were aged 6–10 (34%), followed by children aged 3–5 (26%) and 11–15 (20%). Children in younger and older age groups than these accounted for a lower proportion of service recipients. Children aged under 1 accounted for 2% of service recipients, while 11% were aged 1–2 (Appendix Table A3.1; Figure 3.1).

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

In both 2012–13 and 2013–14, there was no difference in the proportion of audiology services received by males and females (50% each) (Appendix Table A3.1).



Note: Data are reported only for children and young people where consent was obtained.

Source: Appendix Table A3.1.

Figure 3.1: Children and young people who received audiology services, by age, 2012–13 and 2013–14

3.3 Results of hearing assessment

It is important to measure different aspects of a child's hearing because it can influence their long-term development in a number of areas, including 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 assist health professionals to treat and manage their hearing health, thereby mitigating its developmental impact.

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 last audiology assessment results. It also contains information on changes over time in children and young people who received 2 or more audiology services. Box 3.1 contains information about methods of audiological assessment.

It is important to note that because 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, 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 may reflect 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 3.1: 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 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.

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

A diagnosis of hearing loss is when any pure tone audiometry hearing threshold response falls outside the normal range in either ear at any sound frequency. Hearing loss may affect one ear (unilateral) or both ears (bilateral). There are three types of hearing loss: sensorineural, conductive and mixed.

Hearing impairment describes a functional limitation that may affect activity or participation, as the degree of functional impairment associated with hearing loss in the better ear, using a scale of mild, moderate, severe and profound. Definitions of hearing loss and hearing impairment are outlined in Box 3.2.

Figure 3.2 shows the relationship between these components of hearing health. Note that 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).

Box 3.2: Definitions of hearing loss (status and type), and degree 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 3.1), so it is not able to be determined whether hearing loss is unilateral or bilateral, but 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 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). Using this categorisation system, some children classified as having mild hearing impairment in the standard system (see Appendix D) would be classified as having moderate hearing impairment.

The system used by the 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 in understanding words. Additional rehabilitation is needed, and cochlear implants, lip-reading and sometimes signing are essential.

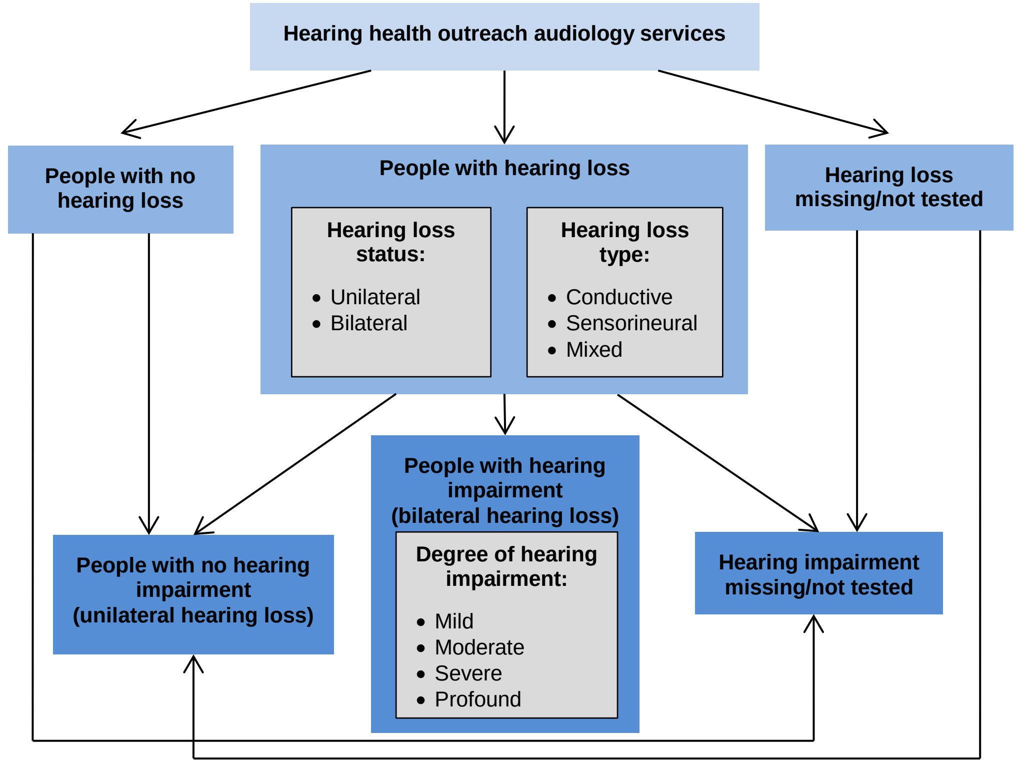


Figure 3.2: Relationship between hearing loss (type and status) and hearing impairment in the audiology data collection

Hearing loss status

Table 3.2 shows that hearing loss was present in over half (55%) of children and young people who received audiology services in 2013–14 at their latest service—36% bilateral and 19% unilateral. Between 2012–13 and 2013–14, the proportion of children and young people with hearing loss increased, from 52% to 55%, due to an increase in the proportion with unilateral hearing loss (16% in 2012–13 to 19% in 2013–14). However, it should be noted that this observed increase in hearing loss may also be partly due to the implementation of a priority listing system in January 2013, whereby children and young people with poorer ear and hearing health are more likely to receive services first (see Section 3.6).

The proportion of children and young people with no hearing loss remained about the same between 2012–13 (36%) and 2013–14 (35%).

Table 3.2: Hearing loss status[(a)], children and young people who received audiology services, 2012–13 and 2013–14

	2012–13		2013–14		Total[(b)]	
Hearing loss status	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Hearing loss[(c)]	850	51.7	963	55.2	1,453	50.9
Unilateral (one ear)	255	15.5	339	19.4	491	17.2
Bilateral (both ears)	595	36.2	624	35.8	962	33.7
No hearing loss	587	35.7	616	35.3	1,107	38.8
Missing[(d)]/not tested[(e)]	208	12.6	164	9.4	294	10.3
Total service recipients	**1,645**	**100.0**	**1,743**	**100.0**	**2,854**	**100.0**

(a) Where children or young people received multiple audiology services, data are from the latest service.

(b) Total includes all children/young people who received audiology services from 1 July 2012 to 30 June 2014. 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/young people may have received services in both financial years.

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

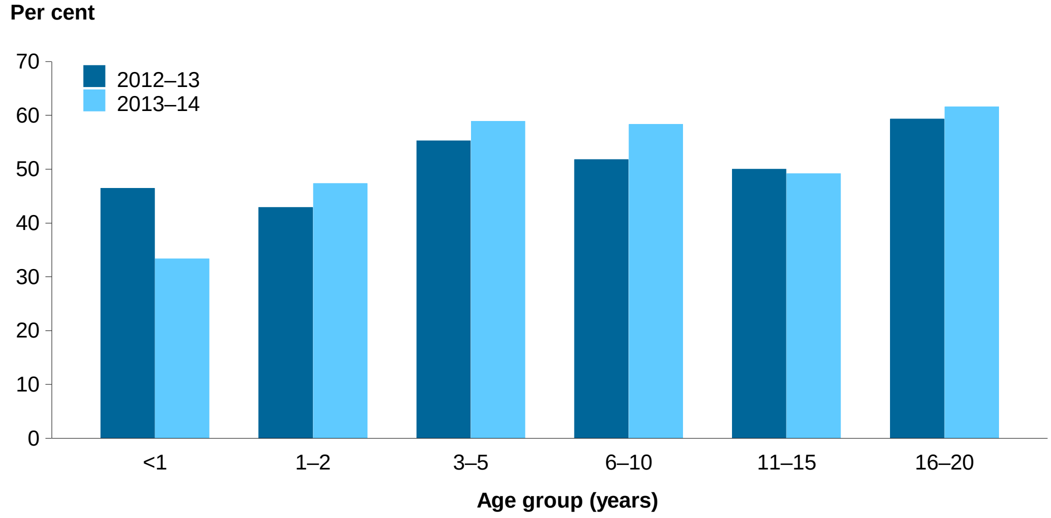
(d) Missing includes not stated, unsure and invalid responses.

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

Note: Data are reported only for children and young people where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Patterns of hearing loss varied by age, with rates being lowest among children aged under 1 (33%), and highest among young people aged 16–20 (62%), children aged 3–5 (59%) and 6–10 (58%) in 2013–14 (Appendix Table A3.2). Between 2012–13 and 2013–14, increases in hearing loss were seen among those aged 6–10 (52% in 2012–13 to 58% in 2013–14), 1 to 2 years (43% to 47%) and 3–5 (55% to 59%). The proportion of children with hearing loss aged under 1 decreased (46% to 33%) (Figure 3.3).



Note: Data are reported only for children and young people where consent was obtained.

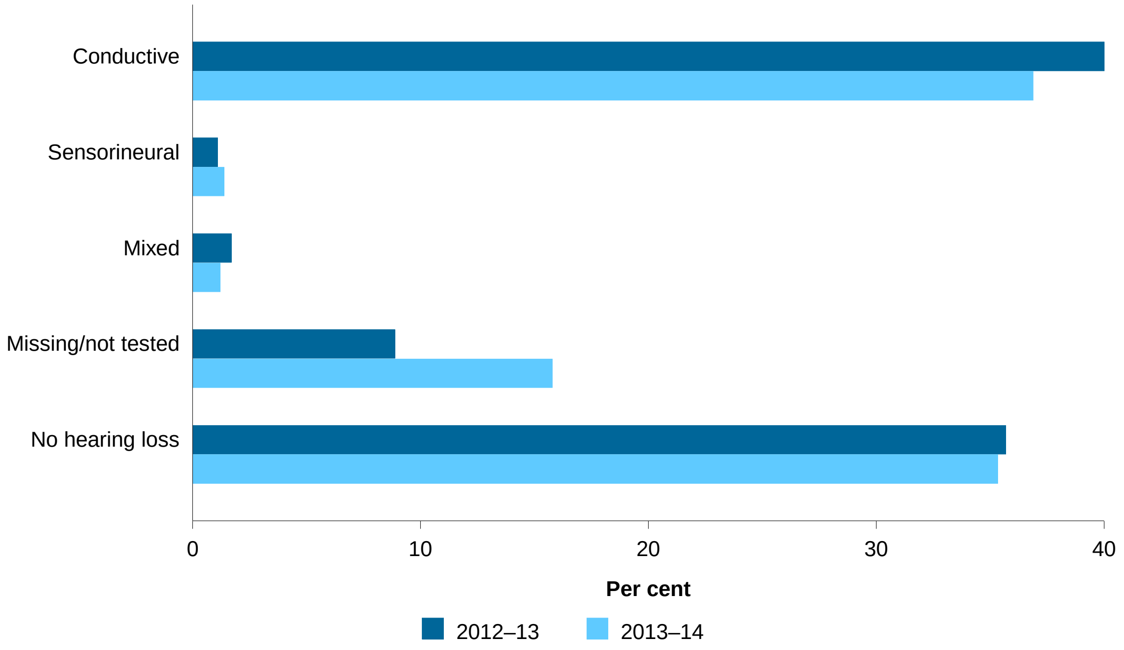
Source: Appendix Table A3.2.

Figure 3.3: Proportion of children and young people who received audiology services with hearing loss, by age, 2012–13 and 2013–14

Type of hearing loss

In 2013–14, 37% of children and young people who received outreach audiology services had conductive hearing loss at their latest service; this is a decrease from 2012–13, for which 40% had conductive hearing loss (Figure 3.4; see Box 3.2 for definitions).

From July 2012 to June 2014, just over half of the children and young people who received audiology services were found to have hearing loss (51%)—the majority being conductive 36%—while 39% did not have hearing loss, and 10% had missing or not tested hearing loss type. A small proportion were found to have sensorineural or mixed hearing loss (less than 2% each) (Appendix Table A3.3).



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

Source: Appendix Table A3.3.

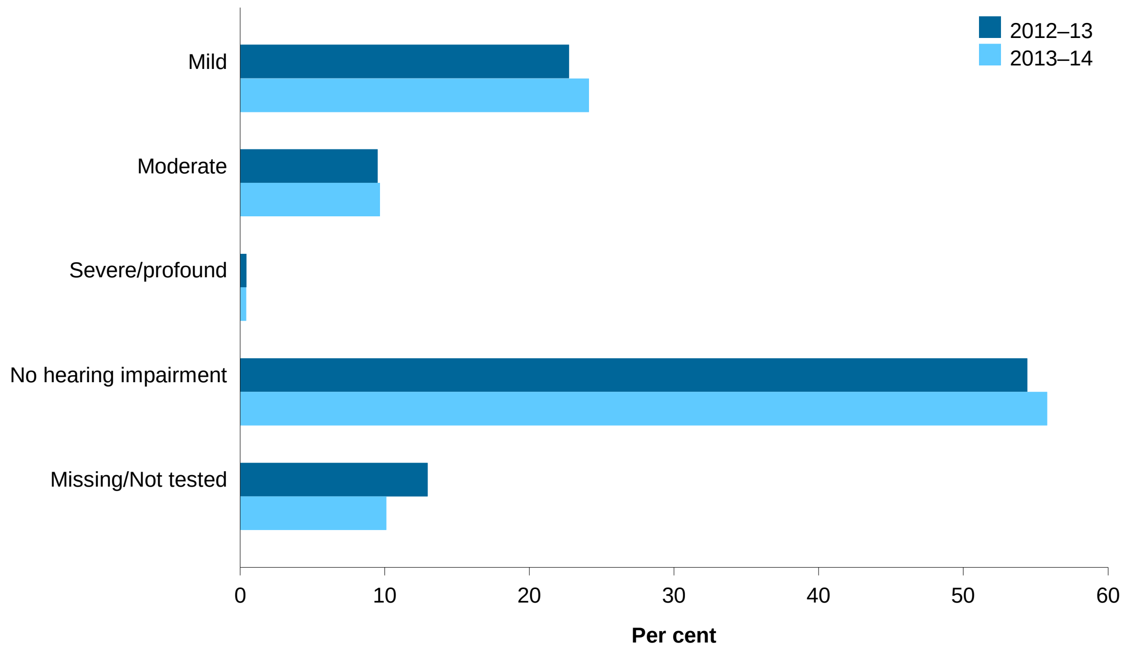
Figure 3.4: Type of hearing loss among children and young people who received outreach audiology services, 2012–13 and 2013–14

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 (see Box 3.2).

In 2013–14, 34% of children and young people who received outreach audiology services had some form of hearing impairment. The majority of these children and young people had mild hearing impairment, comprising almost one-quarter (24%) of all those who received audiology services. About 10% had a moderate hearing impairment, while less than 1% had a severe or profound hearing impairment (Appendix Table A3.4; Figure 3.5).

The proportion of children and young people with a hearing impairment in 2012–13 was similar to that in 2013–14 (33% and 34%, respectively); patterns in degree of hearing impairment were also generally similar for both years.



Note: Data are reported only for children and young people where consent was obtained.

Source: Appendix Table A3.4.

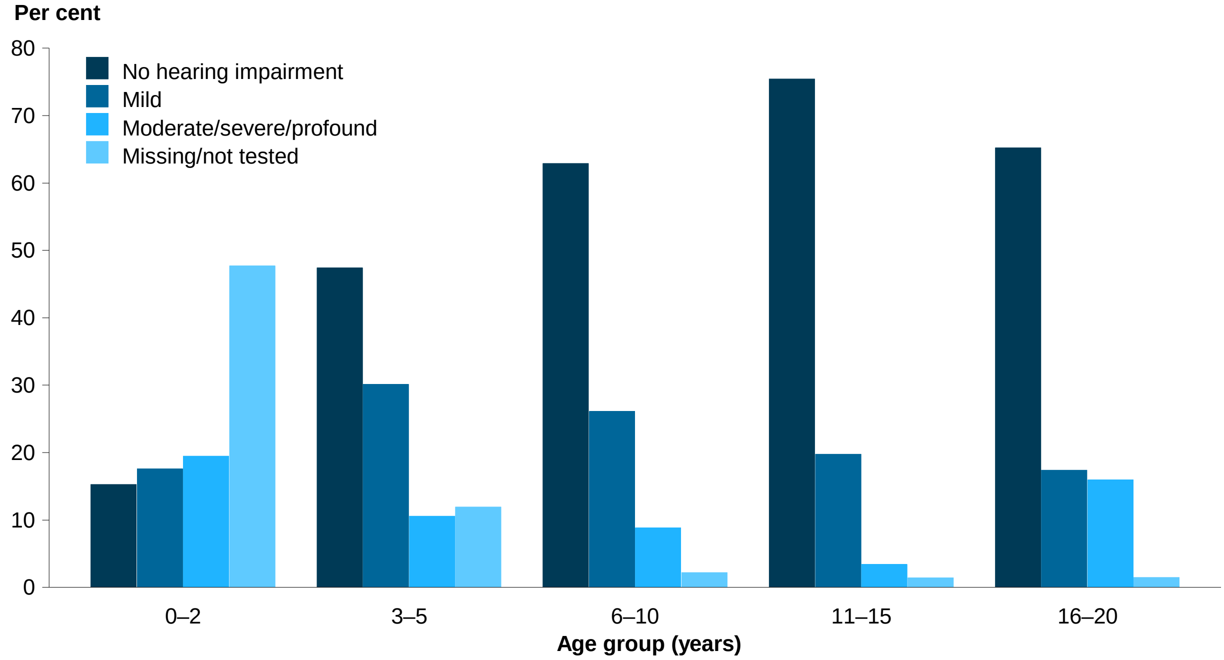
Figure 3.5: Degree of hearing impairment, children and young people who received outreach audiology services, 2012–13 and 2013–14

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

As shown in Figure 3.6 (and Appendix Table A3.5), in 2013–14:

- 20% of children aged 0–2 had moderate, severe or profound hearing impairment and 18% had mild hearing impairment
- 11% of children aged 3–5 had moderate, severe or profound hearing impairment and 30% had mild hearing impairment
- 9% of children aged 6–10 had moderate, severe or profound hearing impairment and 26% had mild hearing impairment
- 3% of children aged 11–15 had moderate, severe or profound hearing impairment and 20% had mild hearing impairment
- 16% of young people aged 16–20 had moderate, severe or profound hearing impairment and 17% had mild hearing impairment.

Between 2012–13 and 2013–14, there was no change in the overall proportion of children and young people who had moderate, severe or profound hearing impairment (10%). However, there were changes for some age groups: while there was an increase in the proportion aged 6–10 with these levels of hearing impairment (from 6% in 2012–13 to 9% in 2013–14), there were decreases in the proportions for those aged 11–15 (7% to 3%) and 3–5 (13 to 11%). In terms of mild hearing impairment, there were slight increases in the proportions for younger age groups (those aged 0–2, 3–5 and 6–10) between 2012–13 and 2013–14.



Note: Data are reported only for children and young people where consent was obtained.

Source: Appendix Table A3.5.

Figure 3.6: Degree of hearing impairment by age, children and young people who received outreach audiology services, 2013–14

3.4 Further action required

During audiology consultations, audiologists recommend appropriate further action for the continued care of the service recipient. These actions may include care from an ENT specialist, primary health care or other hearing services, rehabilitation, and educational services. In 2013–14, of the over 1,740 children and young people who received audiology services, 69% required further action (Appendix Table A3.6). The most common actions recommended were ongoing monitoring by Northern Territory Hearing Services (59%), case management by a primary health centre (17%) and case management by an ENT specialist (17%).

Between 2012–13 and 2013–14, the proportion of children and young people recommended for at least 1 further action decreased slightly (from 72% to 69%). There were notable decreases in the proportions recommended for the most common actions. For example, the proportion recommended for case management by an ENT specialist almost halved, from 31% in 2012–13 to 17% in 2013–14; recommendations for case management by a primary health centre decreased from 24% to 17%; and ongoing monitoring by Northern Territory Hearing Services decreased from 63% to 59%. These patterns were also observed in children and young people with hearing loss. There was a particularly marked fall in the proportion with hearing loss for whom case management by an ENT specialist was recommended, almost halving from 49% in 2012–13 to 25% in 2013–14. However, this result should be interpreted with caution as it is mainly due to a change in the processes for providing teleotology services. Previously, teleotology services included only ENT services; however, teleotology services may now include both ENT and audiology services (in which case, audiologists would not need to recommend case management by an ENT specialist).

The majority of children who required further action were children with hearing loss. However, a small proportion of children who previously had hearing loss but were not diagnosed with hearing loss at their latest check required further monitoring or other actions.

3.5 Changes in hearing loss and impairment during treatment

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—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.

Children and young people who received at least 2 outreach audiology services—July 2012 to June 2014

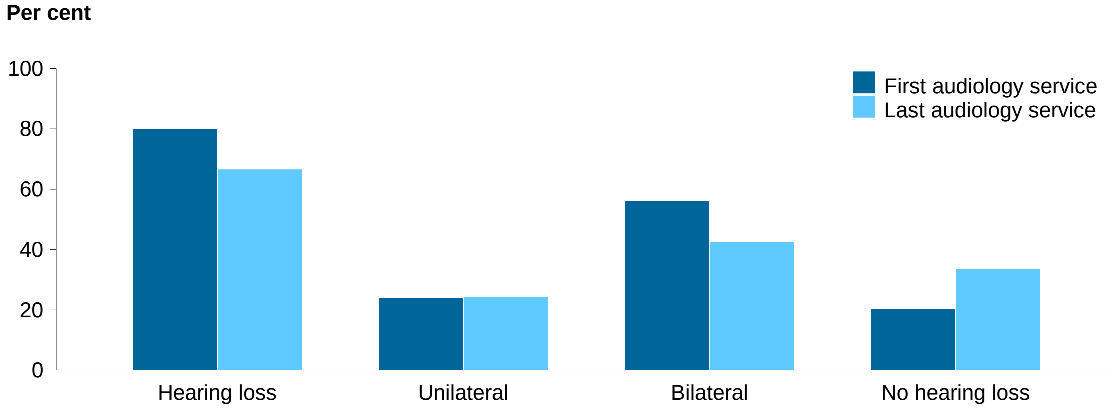
Changes in hearing loss

Among over 620 children and young people who received 2 or more hearing health outreach audiology services between July 2012 and June 2014, there were improvements in hearing loss over time. Between their first and last service, there was a 17% decrease in the proportion with hearing loss (from 80% of children and young people at their first audiology service to 67% at their last service) (Appendix Table A3.7). This decrease comprised mostly those who had bilateral hearing loss, with a 24% decrease in the rate of hearing loss among these children and young people (from 56% at the first service to 43% at the last service). Overall, there was no change in the proportion with unilateral hearing loss between the first and last services (24%) (Figure 3.7).

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 3.3 shows that, overall, among those who had 2 or more outreach audiology services between July 2012 and June 2014, there were improvements for children and young people with hearing loss at the first service:

- Of the 349 children and young people who had bilateral hearing loss at their first service, 22% had no hearing loss at their last service and 21% had unilateral hearing loss, while 57% still had bilateral hearing loss.
- Of the 149 children and young people who had unilateral hearing loss at their first service, 38% had no hearing loss at their last service, 37% still had unilateral hearing loss, and 26% developed bilateral hearing loss.
- Of the 126 children and young people who had no hearing loss at their first service, 62% still had no hearing loss at their last service, 17% had unilateral hearing loss, and 21% had bilateral hearing loss.

- There were 498 children and young people with hearing loss at their first service (149 with unilateral hearing loss and 349 with bilateral hearing loss). Hearing loss status improved for 41% of these children and young people. This comprised:
  - 131 children and young people (or 26%) who recovered from hearing loss at their last outreach audiology service, of which 56 had unilateral hearing loss and 75 had bilateral hearing loss at their first outreach audiology service.
  - 74 children and young people (or 15%) who improved from bilateral to unilateral hearing loss.



Notes

1. Data are reported only for children and young people 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 A3.7.

Figure 3.7: Change in hearing loss status among children and young people who received at least 2 outreach audiology services between July 2012 and June 2014

Table 3.3: Change in hearing status, children and young people who received at least 2 outreach audiology services, 2012–14(a)(b)

	Hearing loss status at last service							
	No hearing loss		Unilateral		Bilateral		Total	
Hearing loss status at first service	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
No hearing loss	78	61.9	21	16.7	27	21.4	126	100.0
Unilateral	56	37.6	55	36.9	38	25.5	149	100.0
Bilateral	75	21.5	74	21.2	200	57.3	349	100.0
Total	**209**	**33.5**	**150**	**24.0**	**265**	**42.5**	**624**	**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.

Note: Data are reported only for children and young people where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Changes in hearing impairment

Among children and young people who received 2 or more outreach audiology services, over 100 had some degree of hearing impairment at their first check (Table 3.4). Of these, half had an improvement in their degree of hearing impairment (that is, a movement to a less severe hearing impairment category), and 40% had no change in their degree of hearing impairment. About 10% of these children and young people experienced deteriorated hearing impairment between their first and last audiology service (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.

Table 3.4: Change in degree of hearing impairment, children and young people who received at least 2 outreach audiology services(a)(b)

Change in hearing impairment	Number	Per cent
Improved(c)	51	50.0
No change	41	40.2
Deteriorated(d)	10	9.8
Total children	**102**	**100.0**

(a) Median time between first and last service: 7 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 children 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).

Notes

1. Data are reported only for children and young people where consent was obtained.
2. Services include only those that were provided through the audiology and ENT programs.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

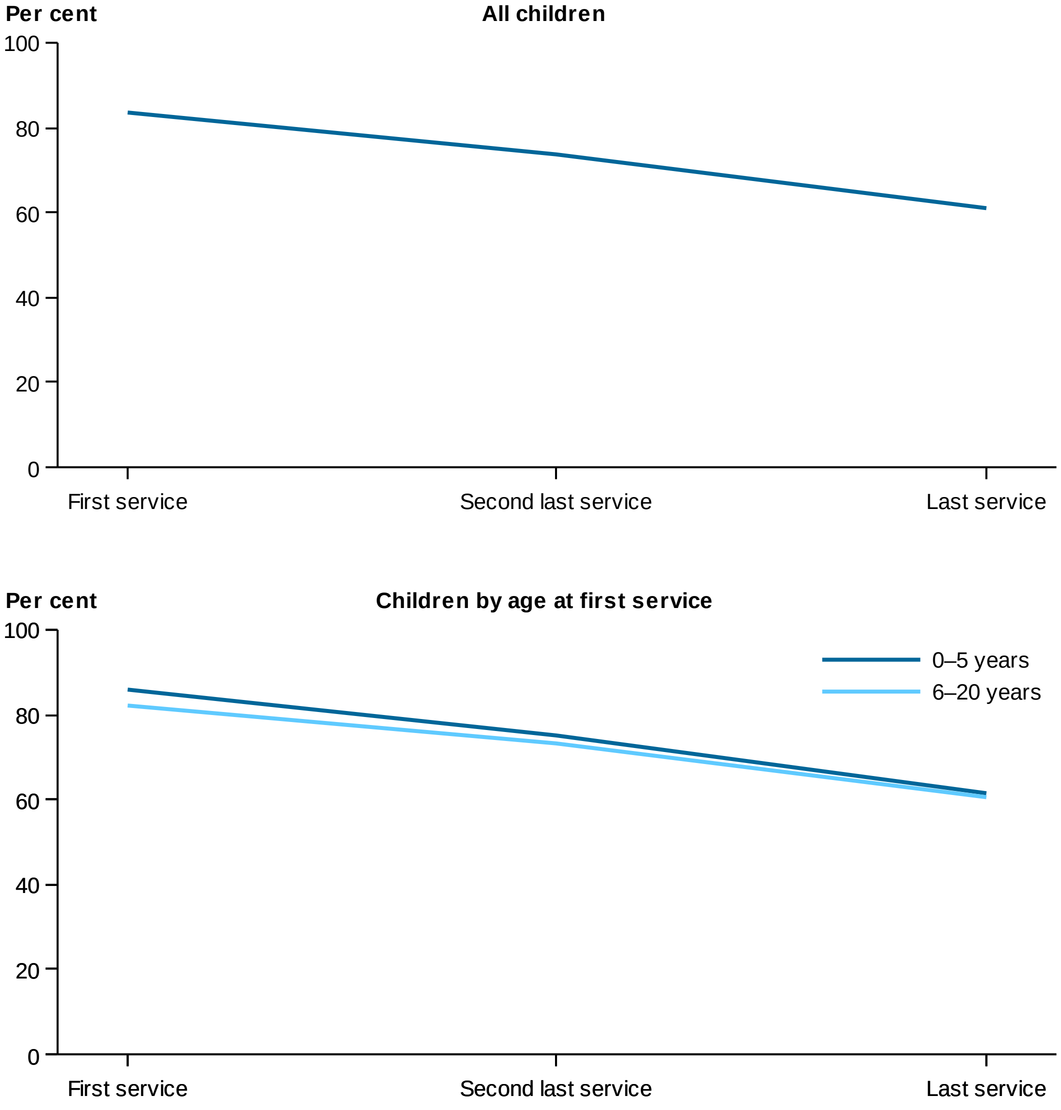
Children and young people who received at least 3 outreach audiology services—August 2007 to June 2014

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 2014. Analysis of services from CHCI(CtG) have been included here in order to assess longer term hearing health outcomes since the start of CHCI(CtG).

Changes in hearing loss

Figure 3.8 shows 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 2014. It measures hearing loss status at the first service, second last service and last service. The minimum time interval between services is 3 months, to allow analysis of longer term outcomes. The figure also presents the analysis by age group at first service.

As shown, there was continual improvement in the hearing health of those analysed. From a total of over 1,000 children and young people who received 3 or more services, 84% had hearing loss at their first outreach audiology service, which decreased to 74% at the second last service and 61% at the last service. Although the proportions with hearing loss were slightly lower among those aged 6–20 compared with those aged 0–5, the patterns were similar among these groups, with proportions decreasing between the first and last service (Figure 3.8).



Notes

1. Includes children and young people who received 3 or more hearing health audiology outreach services between August 2007 and June 2014. Excludes children with missing or not tested responses for hearing loss status.
2. Minimum time between services: 3 months. Median time interval between first and second last service: 18 months. Median time interval between second last and last service: 11 months.
3. Data are reported only for children and young people where consent was obtained.

Source: Appendix Table A3.8.

Figure 3.8: 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 2014

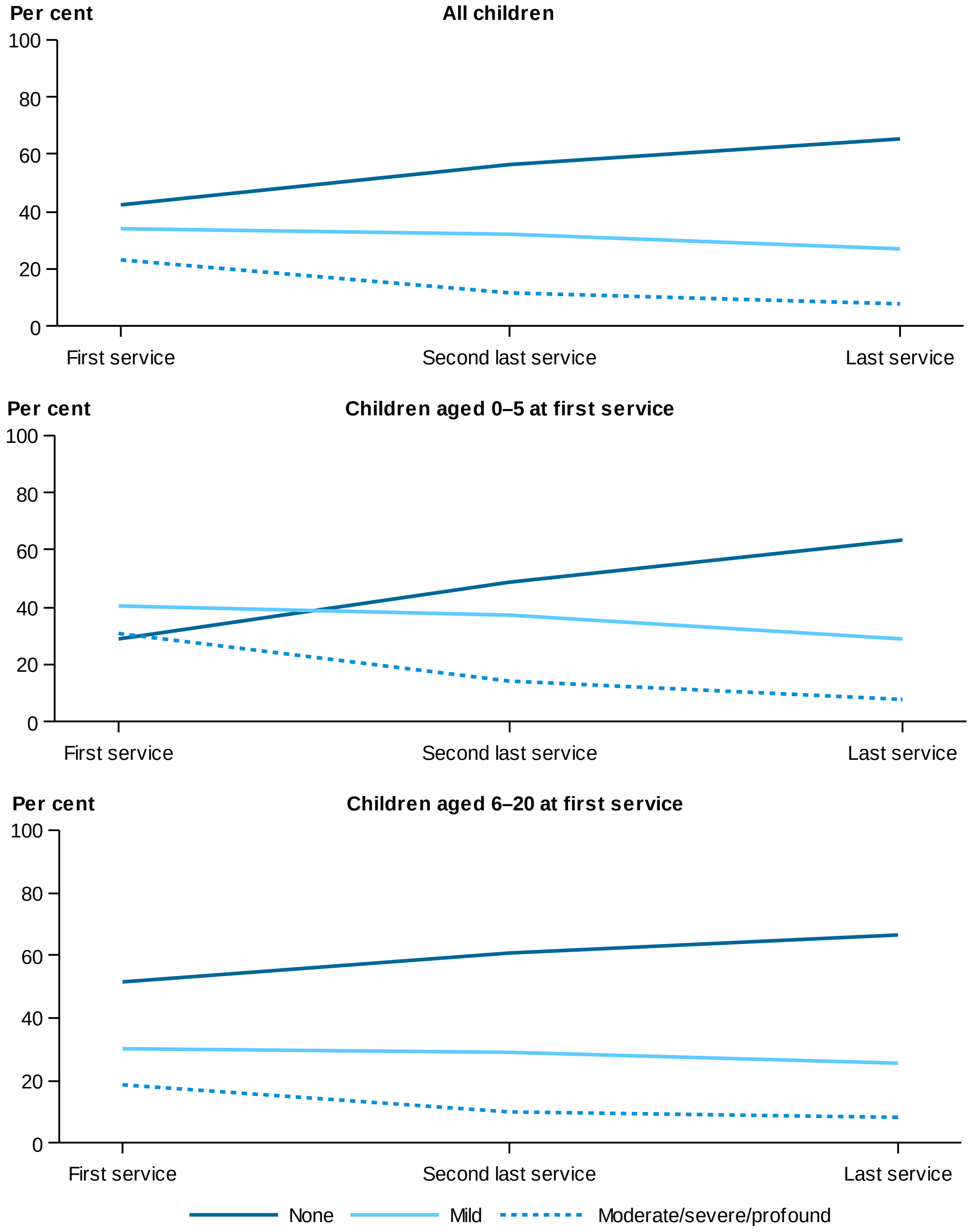
Changes in hearing impairment

Figure 3.9 shows changes in hearing impairment among children and young people who received 3 or more outreach audiology services. The proportion of the over 1,000 children and young people with hearing impairment decreased between the first and last services. At the first service, 34% had mild hearing impairment, which decreased to 32% at the second last service, and to 27% at the last service. There was an even greater decrease in the proportion with moderate, severe or profound hearing impairment, reducing from 23% at the first service to 11% at the second last service and to 8% at the last service. Correspondingly, there was an increase in the proportion with no hearing impairment, from 43% at the first service to 65% at the last service.

For both younger and older age groups, there were decreases in the proportion with hearing impairment (Figure 3.9). 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, with an overall decrease of 11 percentage points in the proportion with mild hearing impairment—from 40% at the first service to 37% at the second last service and to 29% at the last service. There was a decrease of 23 percentage points in the moderate, severe or profound hearing impairment category—from 31% at the first service to 8% at the last service. 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.

For the older age group (6–20), between the first and last service, the proportion with mild hearing impairment decreased by 5 percentage points (from 30% to 25%). The proportion with moderate, severe or profound hearing impairment decreased by 10 percentage points (from 18% to 8%) (Figure 3.9).

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 may be associated with differences in the types of otitis media among children in different age groups (see Table A6.2). 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 impairment. By contrast, those in older age groups are more likely to have chronic otitis media. If a person’s hearing has been damaged severely and permanently, it is less likely that they can reverse hearing impairment even after medical intervention.



Notes

1. Includes children and young people who received 3 or more hearing health audiology outreach services between August 2007 and June 2014. Excludes those with missing or not tested responses for hearing impairment status.
2. Minimum time between services: 3 months. Median time interval between first and second last service: 18 months. Median time interval between second last and last service: 18 months.
3. Data are reported only for children and young people where consent was obtained.

Source: Appendix tables A3.9, A3.10 and A3.11.

Figure 3.9: 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 2014

3.6 Demands on audiology services

Although more than 4,000 audiology outreach services were provided over the last two financial years, there was a high demand for these services in remote communities in the Northern Territory. As at 30 June 2014, over 5,510 children were on the audiology referral list and were waiting to be seen.

Table 3.5 shows the number of people aged under 21 who received audiology referrals and were on the waiting list in remote Northern Territory communities as at 30 June 2014. Over 80% of these referrals were made for children aged 0–15 and 19% were made for those aged 16–20.

Table 3.5: Number 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 2014

Health Service Delivery Area	Number (%) of referrals 0–15 years	Number (%) of referrals 16–20 years	Total (%)
Barkly	380	73	453
Central Australia	1,100	269	1,369
East Arnhem	865	165	1,030
Katherine	931	235	1,166
Top End	1,206	286	1,492
Total	**4,483 (81.3%)**	**1,028 (18.7%)**	**5,511 (100%)**

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 3.6. 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. This change in the process used to select who receives services first has an impact on 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 3.6: 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 aged 6–10 with a documented moderate or worse hearing impairment and requiring review, or a new referral from a primary health practitioner
3	Audio Routine	Audiology reviews with hearing loss and open ear disease and those with bilateral otitis media with effusion (OME)
4	Audio Low	Audiology reviews others (should be minimal/ no hearing loss, closed otitis media/eustachian tube dysfunction)

(a) See Box 3.1 for more information about VROA.

Source: NT DoH, unpublished data.

4 Child Hearing Health Coordinator program

Key findings

- In 2013–14, CHHCs conducted almost 700 visits to 675 Indigenous children in the Northern Territory. This was a notable increase from 2012–13 in which there were 511 visits to 504 children. From July 2012 to June 2014, CHHCs conducted about 1,220 visits to 1,140 children.
- The most common type of service provided was ear health education, which was provided at almost all visits in both 2012–13 and 2013–14.
- The most common types of service providers contacted by CHHCs were education providers and health providers (51% and 66% of visits in 2012–13 and 2013–14, respectively).
- A total of 90% of children who received CHHC services in 2013–14 were diagnosed with at least 1 middle ear condition—a decrease from 97% in 2012–13. The condition diagnosed most often was OME, with half of the children having this condition at their first visit in 2013–14.
- In 2013–14, among children who received both CHHC and audiology services, 83% had some form of hearing loss (mostly bilateral) and 65% had some form of hearing impairment.

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

CHHC services are provided to Indigenous children aged 15 and under who have a diagnosed ear condition or hearing impairment, and who have been assigned a hearing health priority listing (see Box 4.1). Coordinators operate from seven regionally based Health Development Teams in the Northern Territory.

The program is based on a case management model of service delivery, where the coordinators administer clinical care and link children with specialist and community health services. This approach was developed in response to the difficulties faced in treating ear disease in the Northern Territory; its persistent and recurrent nature, as well as the challenges involved in delivering services in remote areas, made ear disease very complicated to manage (AIHW 2011).

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 4.1), it is appropriate to present the information based on the status of children upon entry into the program.

Box 4.1 CHHC hearing health priority listing categories

CHHC services are available to Indigenous children in the Northern Territory who have been assigned a priority listing. The hearing health priority 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 otitis media with effusion
- HP3: children aged 3–5 with perforation of the ear drum (with or without discharge), recurrent acute otitis media, persistent bilateral otitis media with effusion or moderate to profound hearing impairment
- HP4: children aged 6–10 with moderate, severe or profound hearing impairment.

4.1 CHHC data collection

At the end of each visit, a service form is completed by the CHHC. These forms are received and processed by the AIHW for inclusion in the CHHC data collection. The CHHC data include:

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

4.2 Children and visits

In 2013–14, CHHCs conducted almost 700 visits to 675 children (Table 4.1). This was a notable increase from 2012–13, for which about 510 visits were provided to over 500 children. From July 2012 to June 2014, CHHCs conducted over 1,200 visits to 1,140 children.

Rates of non-consent were high compared with those for other hearing health services included in this report. From July 2012 to June 2014, consent to share information was not provided for the majority of children who received visits, with a non-consent rate of 61% (Table 4.1). 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.

The high rate of non-consent 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 is developing a training program to help improve consent rates.

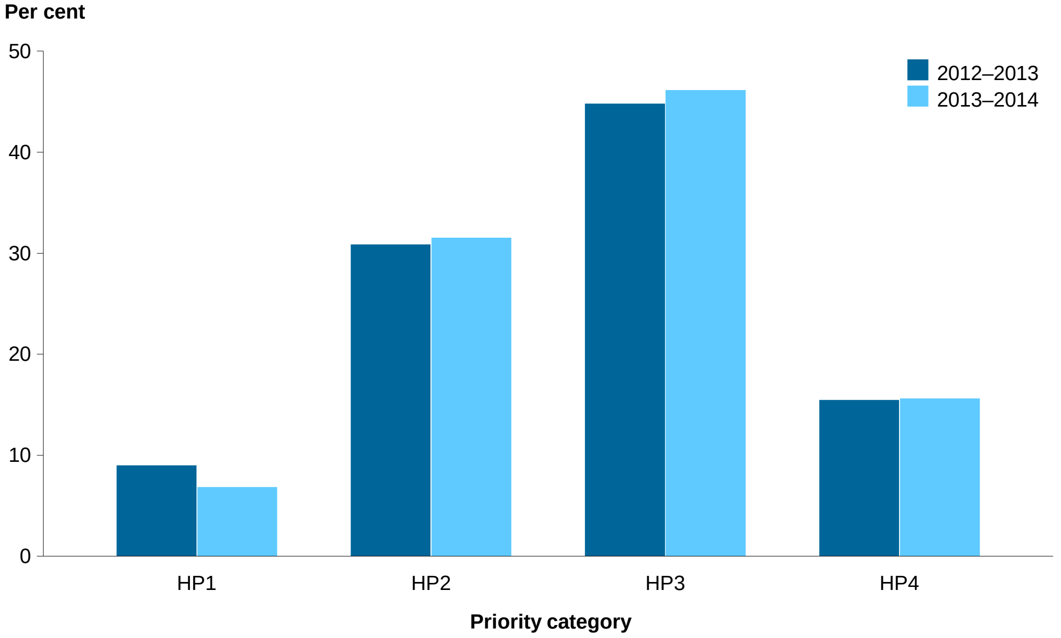
Table 4.1: Number of Indigenous children who received CHHC services and number of visits, by consent status, 2012–13 and 2013–14

	Visits			Children		
	Consent	**Non-consent**	**Total**	**Consent**[(a)]	**Non-consent**	**Total**[(a)]
			Number			
2012–13	201	310	511	194	310	504
2013–14	308	389	697	286	389	675
Total	**509**	**699**	**1,208**	**441**	**699**	**1,140**
			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
Total	**42.1**	**57.9**	**100.0**	**38.7**	**61.3**	**100.0**

(a) The total number of children in 2012–13 and 2013–14 combined does not sum to the rows (2012–13 and 2013–14) because some children received services in both 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 2014).

Among children for whom consent to share information with the AIHW was received, there were slightly more females than males who received CHHC services in 2012–13 (54% and 46%, respectively). In 2013–14, there were similar proportions of male and female service recipients (49% and 51%, respectively) (Appendix Table A4.1).



Notes

1. See Box 4.1 for definitions of CHHC hearing health priority listing categories.
2. Data are reported only for children where consent was obtained.

Source: Appendix Table A4.1.

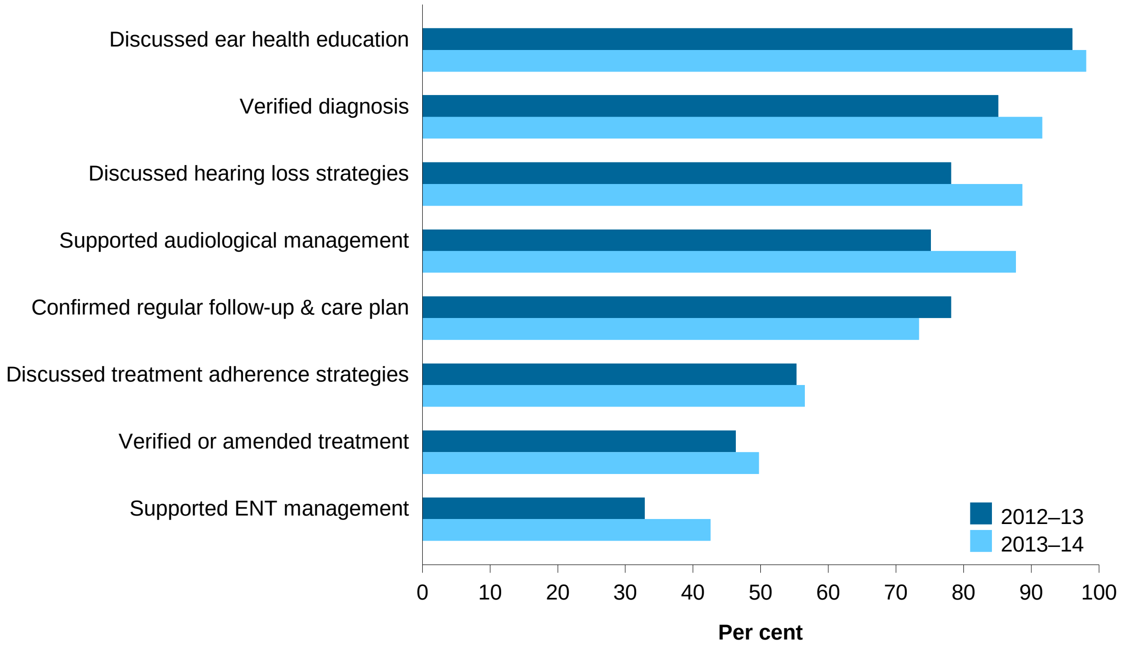
Figure 4.1: Proportion of children who received CHHC services by priority listing, 2012–13 and 2013–14

In terms of priority listing, in 2013–14, hearing priority category 3 was the most common (46%), followed by category 2 (32%). Results were similar in 2012–13 and over the 2 financial years combined (Appendix Table A4.1; Figure 4.1).

4.3 Types of services provided

A range of services have been provided by CHHCs over the course of the program. At almost all visits, CHHCs provide ear health education (at 98% of visits in 2013–14 and 96% in 2012–13) (Figure 4.2). In 2013–14, other services commonly provided included verification of diagnosis (92% of visits), discussion of strategies to minimise hearing loss (89%), and support for audiological management (88%).

Between 2012–13 and 2013–14, there were increases in the proportion of CHHC visits at which most types of services were provided. Most notably, there was an increase in the proportion of visits at which support for audiological management was provided (from 75% in 2012–13 to 88% in 2013–14), discussion of strategies to minimise hearing loss (78% to 89%), support for ENT management (33% to 43%), and verification of diagnosis (85% to 92%).

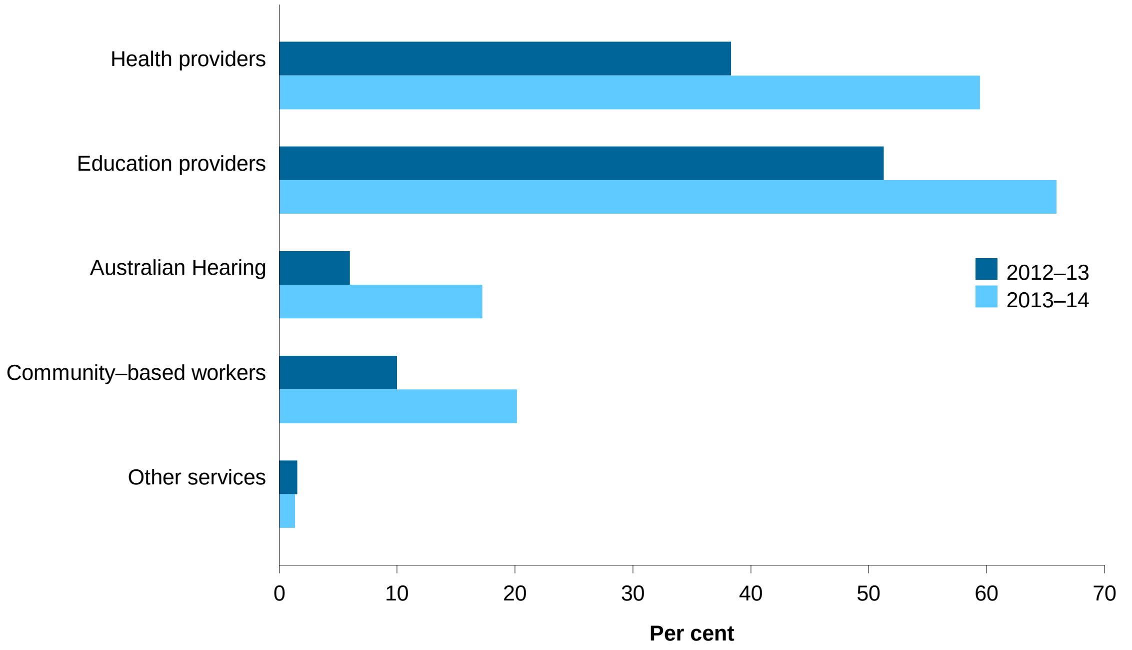


Note: Data are reported only for children where consent was obtained.

Source: Appendix Table A4.2.

Figure 4.2: Type of clinical services provided at CHHC visits, 2012–13 and 2013–14

The CHHCs also assisted children and their families by contacting other service providers. In 2013–14, contact was made with education providers at 66% of CHHC visits, health providers at 59% of visits, and community-based workers at 20% of visits (Figure 4.3). These proportions were marked increases from those for 2012–13 for which CHHCs made contact with education providers at 51% of visits, with health providers at 38% of visits and with community-based workers at 10% of visits.



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

Source: Appendix Table A4.3.

Figure 4.3: Proportion of visits at which CHHCs made contact with other service providers, by service provider type, 2012–13 and 2013–14

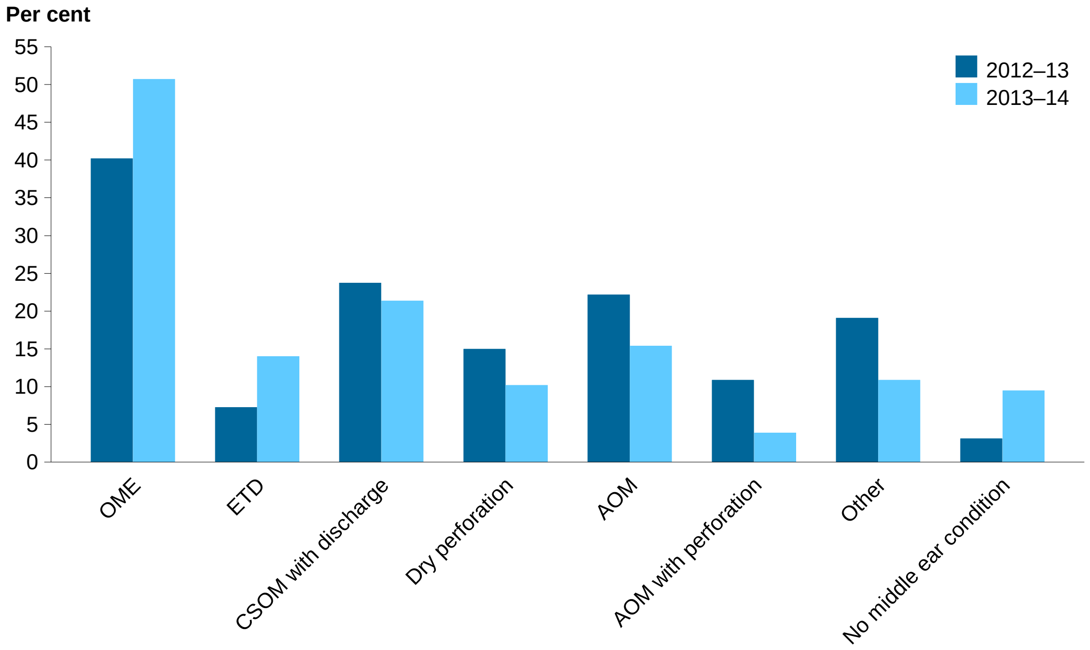
4.4 Ear health of children who received CHHC services

Middle ear conditions

In 2013–14, 91% of children who received a CHHC visit were diagnosed with at least 1 middle ear condition at their first service. This was a decrease from 97% in 2012–13. In 2013–14, the most commonly diagnosed conditions were OME (51% of children), chronic suppurative otitis media (CSOM) with discharge (21%), and AOM (15%). Similarly, these were the most commonly diagnosed conditions in 2012–13, at 40%, 24% and 22%, respectively (Figure 4.4).

A small proportion of children who were diagnosed with ear or hearing health problems before their CHHC visit recovered from their conditions before their visit. Therefore, they were not reported as having middle ear conditions in the CHHC data collection. However, it is important to note that otitis media is a recurrent and persistent condition; although children may not have the ear condition at the time of their CHHC visit, they may still require ongoing management.

From July 2012 to June 2014, 94% of children who received CHHC visits were diagnosed with at least 1 middle ear condition. Almost half of the children were diagnosed with OME (48%), and almost one-quarter with CSOM with discharge (23%) (Appendix Table A4.4).



Notes

1. ETD = Eustachian tube dysfunction.

2. Data are only reported for children where consent was obtained.

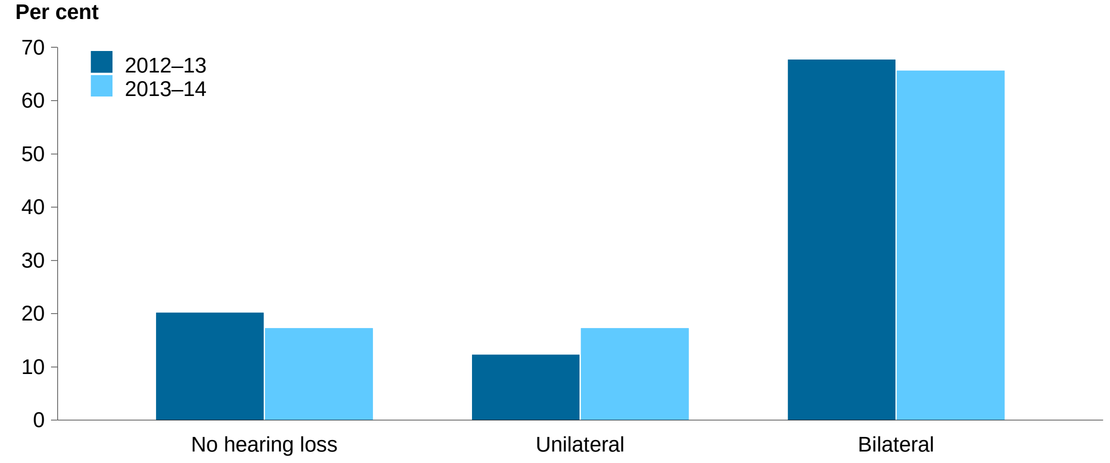
Source: Appendix Table A4.4.

Figure 4.4: Type of middle ear conditions among Indigenous children who received CHHC services, 2012–13 and 2013–14

Hearing loss and impairment

Data on CHHC services do not include information about hearing loss and impairment. However, if children who received CHHC services also received audiology services, it is possible to link the data to determine their hearing health status. In the analyses below, the hearing health status of children who received CHHC services was based on data from the child's last audiology service.

In 2013–14, of almost 290 children who received a CHHC visit, 75% also received an audiology service. Of these children, 83% had some form of hearing loss. Most had bilateral loss (66%), and 17% had unilateral loss (Figure 4.5). The proportion of children with hearing loss increased slightly between 2012–13 and 2013–14 (80% to 83%). There was a slight decrease in the proportion with bilateral loss (68% to 66%) and an increase in the proportion with unilateral loss (12% to 17%) (Appendix Table A4.5).

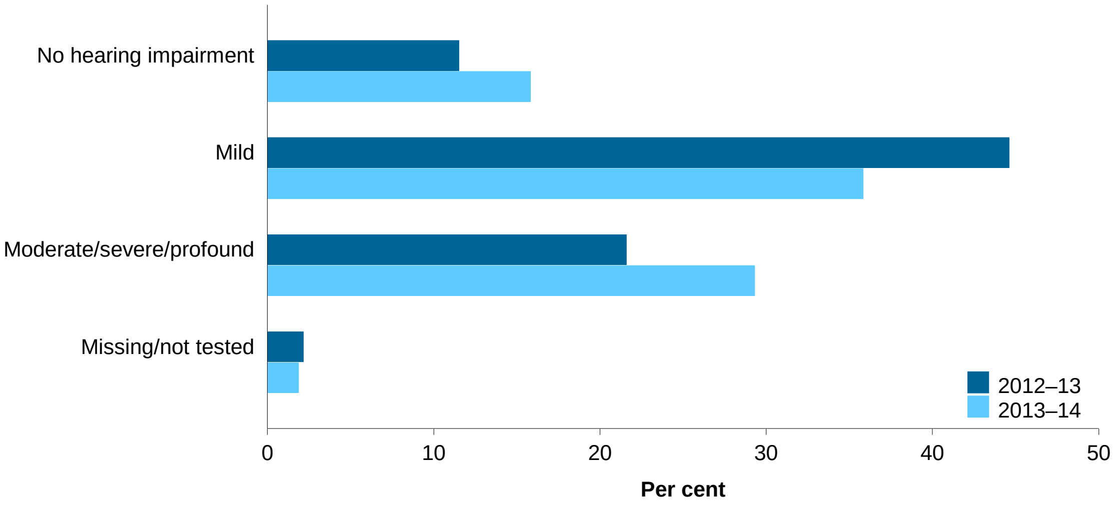


Note: Data are reported only for children where consent was obtained.

Source: Appendix Table A4.5.

Figure 4.5: Hearing loss status among Indigenous children in the CHHC and audiology programs, 2012–13 and 2013–14

Hearing impairment among children receiving both CHHC and audiology services tended to be more common and more severe than among children receiving audiology services only (see Chapter 3). Of the children who received both services and were tested for hearing loss in 2013–14, 65% had some form of hearing impairment—36% mild, and 29% moderate, severe or profound (Figure 4.6). The proportion of children with a hearing impairment was similar for 2012–13 and 2013–14 (66% and 65%, respectively). Although the proportion of children with mild hearing impairment decreased (44% in 2012–13 to 36% in 2013–14), the proportion with moderate, severe or profound impairment increased (22% to 29%).



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

Source: Appendix Table A4.6.

Figure 4.6: Degree of hearing impairment, Indigenous children in the CHHC and audiology programs, 2012–13 and 2013–14

5 Ear, nose and throat teleotology services

Key findings

- Between July 2012 and June 2014, over 1,680 ENT teleotology services were provided to about 1,280 Indigenous children and young people in the Northern Territory. These numbers increased between 2012–13 and 2013–14, from 727 to 766 children and young people. More of these children and young people were in younger than older age groups, and a slightly higher proportion of females than males received services.
- In 2013–14, over one-third of children were recommended some form of treatment, most commonly medication (31%) and aural toilet (14%).
- Between 2012–13 and 2013–14, the proportion of children and young people recommended at least 1 further action increased (84% to 89%). In 2013–14, the most common types of further actions recommended were audiological assessment (76%), and ENT review (67%).
- In 2013–14, myringoplasty (repair of a perforation of the ear drum—see Box 5.1) was recommended to 24% of children and young people. Patterns in surgery recommendations were similar for 2012–13 and 2013–14.

This chapter provides information about ENT medical specialist consultations provided remotely and electronically (ENT teleotology services). Data on face-to-face ENT services are not included in this report. It 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 these children.

5.1 ENT consultation data collection

ENT consultation data are received by the AIHW in paper form from the NT DoH hearing health team. Major data items include:

- information about the children and young people (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 2013–14, 860 ENT teleotology services were provided to almost 770 children and young people. This was an increase from 2012–13 in which about 820 services were provided to almost 730 children and young people. Overall, over 1,680 ENT services were provided and over 1,280 children and young people received services (Table 5.1). Consent to share information with the AIHW was provided for almost all who received services.

Table 5.1: ENT services, and children and young people who received ENT services, by consent status, 2012–13 and 2013–14

	Services			**Service recipients**		
	Consent	**Non-consent**	**Total**	**Consent**[(a)]	**Non-consent**	**Total**[(a)]
			Number			
2012–13	820	4	824	723	4	727
2013–14	846	14	860	752	14	766
Total	**1,666**	**18**	**1,684**	**1,265**	**18**	**1,283**
			Per cent			
2012–13	99.5	0.5	100.0	99.4	0.5	100.0
2013–14	98.4	1.6	100.0	98.2	1.6	100.0
Total	**98.9**	**1.1**	**100.0**	**98.6**	**1.1**	**100.0**

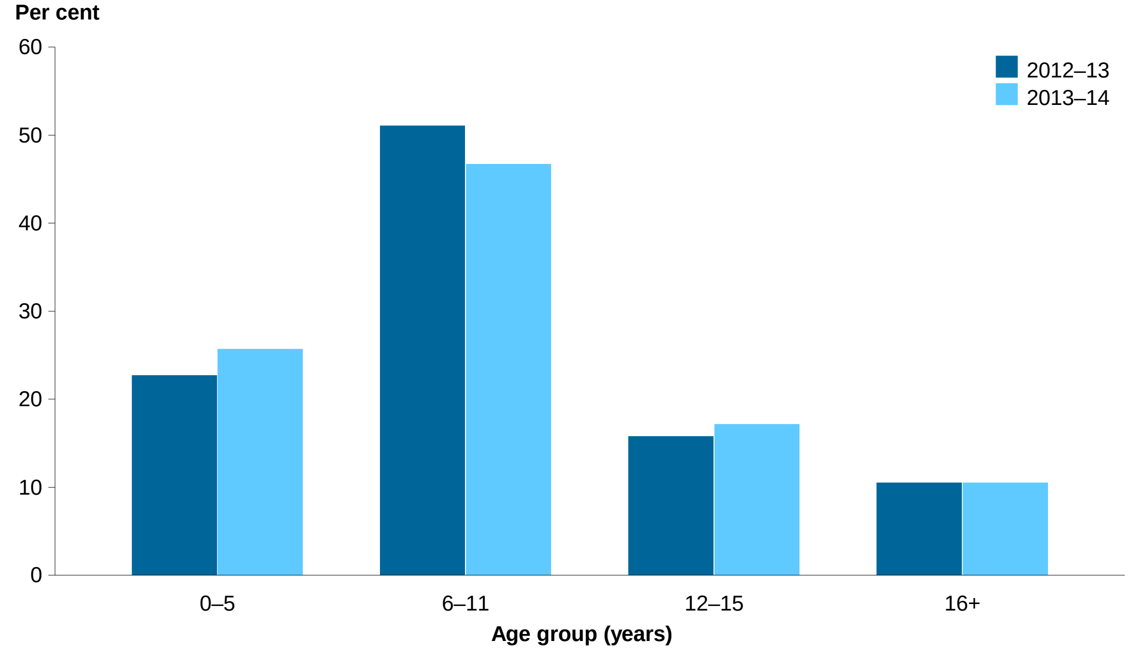
(a) The total number of service recipients in 2012–13 and 2013–14 combined does not sum to the rows (2012–13 and 2013–14) because some children and young people received services in both financial years; these children were counted only once in the total.

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

Source: AIHW analysis of ENT tekeotology data collection (services provided on or before 30 June 2014).

In 2013–14, there were a higher proportion of service recipients in younger rather than in older age groups, with 47% aged 6–11 and 26% aged 0–5, compared with 17% aged 12–15 and 11% aged 16 and over. ENT services are available to children and young people under the age of 21. Age group distributions were similar in 2012–13 and over both financial years combined (Figure 5.1).

There were slightly more females than males who received ENT teleotology services in 2013–14, comprising 54% and 46% of recipients, respectively. These proportions are correspondingly similar to those for 2012–13 (53% and 47%) (Appendix Table A5.1).



Note: Data are reported only for children and young people where consent was obtained.

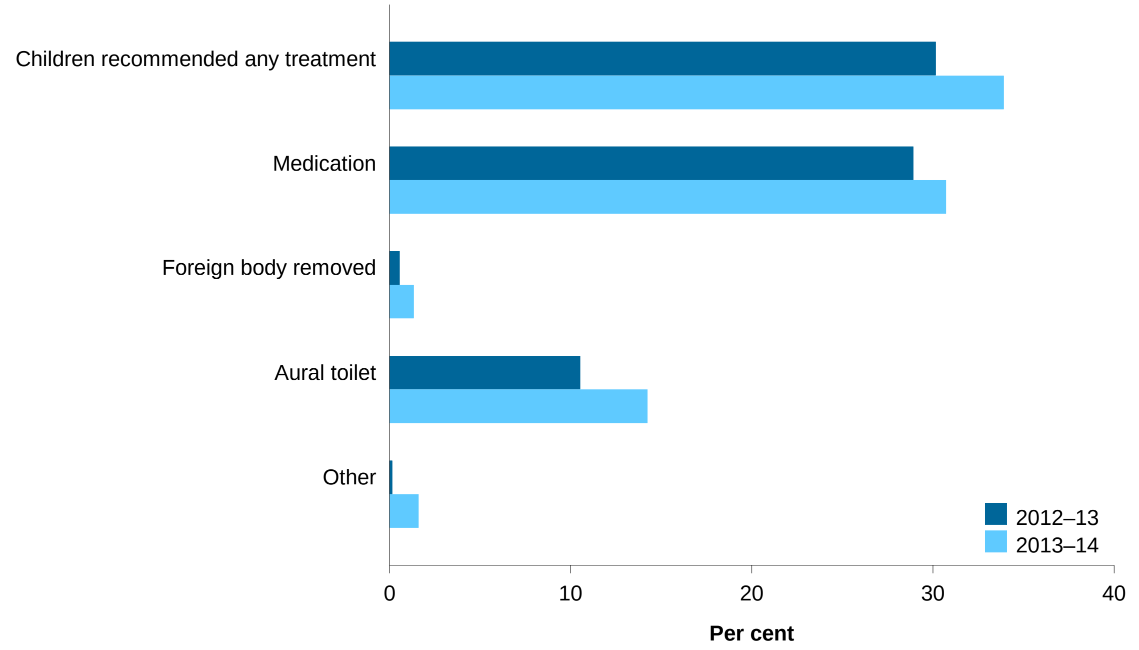
Source: Appendix Table A5.1.

Figure 5.1: Children and young people who received an ENT teleotology service, by age, 2012–13 and 2013–14

Clinical management during ENT teleotology services

As part of ENT teleotology services, ENT specialists recommend treatment to be implemented by the child's primary health care provider. Among about 750 children and young people who received ENT services in 2013–14, 34% were recommended for some form of treatment. The most common type of treatment was medication (31% of children and young people) (Figure 5.2).

Between 2012–13 and 2013–14, there was a slight increase in the proportion of children and young people recommended for some form of treatment (from 30% in 2012–13 to 34% in 2013–14). The greatest increase was in the proportion recommended for aural toilet (from 11% in 2012–13 to 14% in 2013–14).



Note: Data are reported only for children and young people where consent was obtained.

Source: Appendix Table A5.2.

Figure 5.2: Type of treatment recommended among children and young people who received an ENT service, 2012–13 and 2013–14

Further actions and surgery recommended

Further actions recommended

The majority of children and young people who received an ENT teleotology service were recommended for further actions. In 2013–14, over 610 children and young people (82%) were recommended for at least 1 further action. Seventy-six per cent (76%) were recommended for an audiological assessment and 67% for an ENT review. Three per cent (3%) of children receiving an ENT teletology service were recommended for referral to Australian Hearing and for case management by primary health-care services (Figure 5.3).

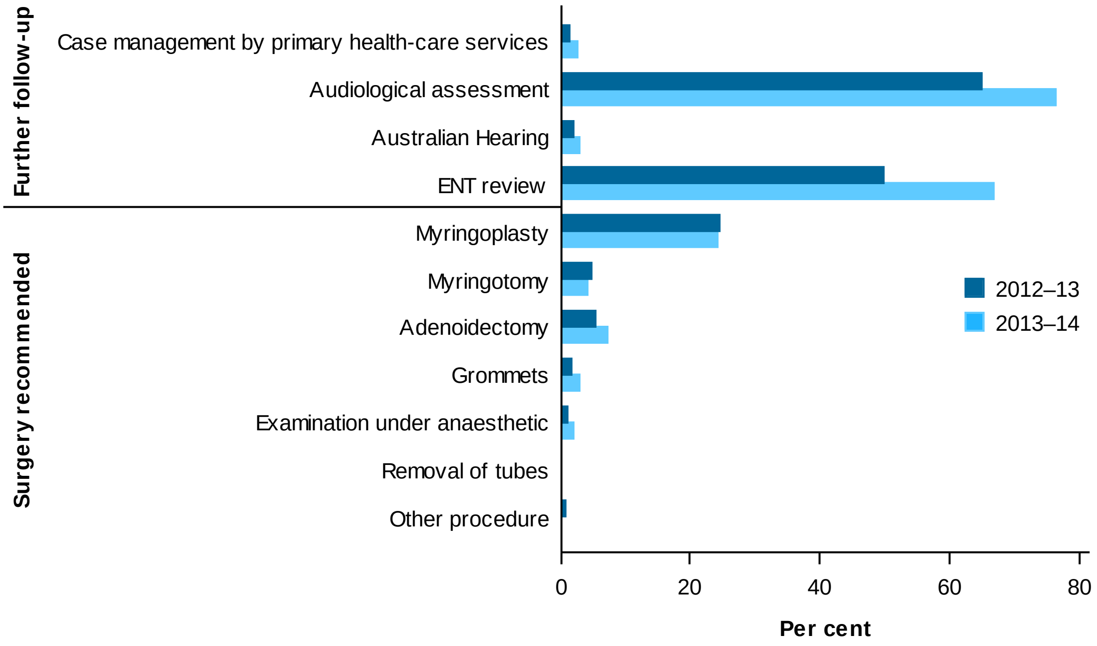
There were large increases between 2012–13 and 2013–14 in the proportions of children and young people recommended for an audiological assessment (from 65% to 76%) or ENT review (from 50% to 67%). Between these financial years, there were also slight increases in the proportions referred to Australian Hearing and for case management by a primary health-care service.

Surgery recommendations

In 2013–14, one-third (32%) of children and young people who received ENT services were recommended for at least 1 type of surgery, most commonly myringoplasty (24%), followed by adenoidectomy (7%), and myringotomy (4%) (Figure 5.3) (see Box 5.1 for explanations of surgery types). The patterns in surgery recommendations in 2013–14 were similar to those in 2012–13 and over both financial years combined.

Box 5.1: Types of surgery

- *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 small tube 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.



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

Source: Appendix Table A5.3.

Figure 5.3: Type of further action required for children and young people who received an ENT service, 2012–13 and 2013–14

5.3 Demands on teleotology services

Teleotology services were implemented in the Northern Territory in 2009. Since then, they have offered an additional method for ENT consultation that complements 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 5.2 shows the number of people aged under 21 on the teleotology referral waiting list in remote communities of the Northern Territory. As at 30 June 2014, 2,455 persons received referrals and were on the waiting list for teleotology services, the majority of them aged under 15. The services were most commonly required by people who lived in Central Australia (682 referrals), followed by Top End (625), Katherine (492), East Arnhem (453) and Barkly (203) (Table 5.2).

Over 80% of these referrals were made for children and young people aged 0–15, and 19% for those aged 16–20.

Table 5.2: 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 2014

	Number (%) of referrals		
Health Service Delivery Area	**<15 years**	**16–20 years**	**Total**
Barkly	155	48	203
Central Australia	514	168	682
East Arnhem	359	94	453
Katherine	412	80	492
Top End	504	121	625
Total	**1,944 (79.2%)**	**511 (20.8%)**	**2,455 (100%)**

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 received services based on the category to which they were assigned. The categories are listed in order of priority in Table 5.3. As the demand for teleotology services is much greater than current service capability, priority listing enables limited resources to be provided first to those most in need. 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 5.3: Priority categories for children and young people requiring teleotology services in the Northern Territory

Priority	Category	Description
1	Post-surgical	Children who require post-surgical follow-up review and monitoring
2	Teleotology High	Children with ‘unsafe’ otitis media, and children previously assessed with moderate conductive hearing loss (bilateral) who have not received an ENT service for more than 6 months Children on the elective surgery waiting list who have not been seen for more than 6 months
3	Teleotology New	Children requiring teleotology assessment in response to a new referral
4	Teleotology Routine	Children previously assessed with mild bilateral hearing loss and those requiring review for surgical candidacy

Source: NT DoH, unpublished data.

6 Middle ear conditions

Key findings

- In 2013–14, of about 1,790 Indigenous children and young people in the Northern Territory who received an audiology or ENT service, 67% were diagnosed with at least 1 type of middle ear condition, most commonly OME (24%) and ETD (15%).
- The prevalence of middle ear conditions among the children and young people analysed was highest among younger children—73% of children aged 0–5 compared with 62% aged 12 and over in 2013–14.
- In 2013–14, out of about 1,200 children and young people diagnosed with at least 1 middle ear condition, 69% experienced hearing loss.
- Rates of hearing loss were highest among children and young people with dry perforation (86% in 2013–14), CSOM with discharge (84%) and OME (72%).
- In 2013–14, among children and young people with at least 1 middle ear condition, 45% had a hearing impairment compared with only 11% of children and young people with no middle ear conditions. Between 2012–13 and 2013–14, the proportion of children with a hearing impairment increased from 38% to 45% among children with a middle ear condition.
- Over half of the children and young people diagnosed with OME, CSOM with discharge and AOM between July 2012 and June 2014 had some form of hearing impairment; the severity of impairment tended to be worse among those diagnosed with these conditions, compared with other middle ear conditions.
- Of about 780 children and young people who received 2 or more ENT or audiology services, there was a decrease of 3 percentage points (81% to 78%) in the proportion diagnosed with at least 1 middle ear condition between the first and last service.

The information presented in this chapter includes information about middle 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 in the most recent service was used for analysis; if children received 2 services on the same day, the ENT diagnosis was used.

This chapter also contains information about the hearing health of these children and young people, and changes in rates of middle ear conditions over time.

Box 6.1 describes the main types of middle ear conditions analysed in this report.

6.1 Types of middle ear conditions diagnosed

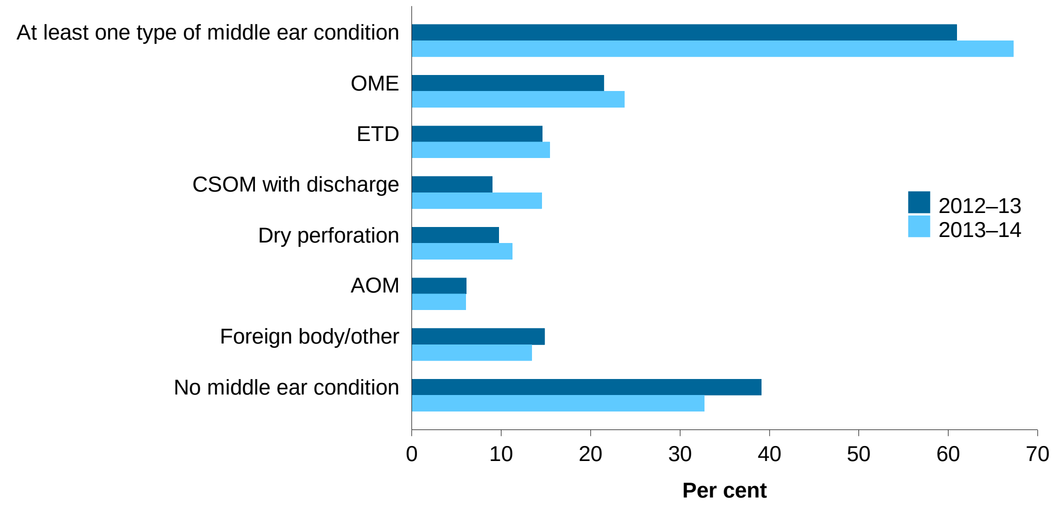
In 2013–14, of about 1,790 children and young people aged under 21 who received an audiology or ENT service, 67% were diagnosed with at least 1 type of middle ear condition at their latest service (Appendix Table A6.1; Figure 6.1). The most common type of middle ear condition was OME (24%); this was followed by ETD (15%) and CSOM with discharge (15%).

The proportion of children and young people diagnosed with at least 1 middle ear condition increased between 2012–13 and 2013–14 (from 61% to 67%), with CSOM with discharge increasing from 9% to 15%, and OME from 22% to 24% (Appendix Table 6.1; Figure 6.1). Note that increases in the proportion of children and young people with middle 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.

Box 6.1: Middle 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*: 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*: 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 with discharge*: a persistent suppurative discharge from the middle ear through a tympanic membrane perforation for more than 6 weeks.
- *Dry perforation*: 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.
- *Eustachian tube dysfunction*: negative middle ear pressure associated with compromised equalisation impeding middle ear function and sometimes causing middle ear fluid accumulation.

Between July 2012 and July 2014, 12% of children and young adults who received audiology or ENT services were diagnosed with CSOM with discharge (Appendix Table A6.1). The World Health Organization defines a prevalence of CSOM 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 3 times this rate. (It should be noted, however, that those who participated in these programs do not constitute a random sample, so the data may not be representative of the whole population of Indigenous children and young people in the Northern Territory.)



Note: Data are reported only for children and young people where consent was obtained.

Source: Appendix Table A6.1.

Figure 6.1: Type of middle ear condition, children and young people who received an audiology or ENT service, 2012–13 and 2013–14

Middle ear conditions varied by age (Figure 6.2), but were mostly the same by sex (Table A6.1).

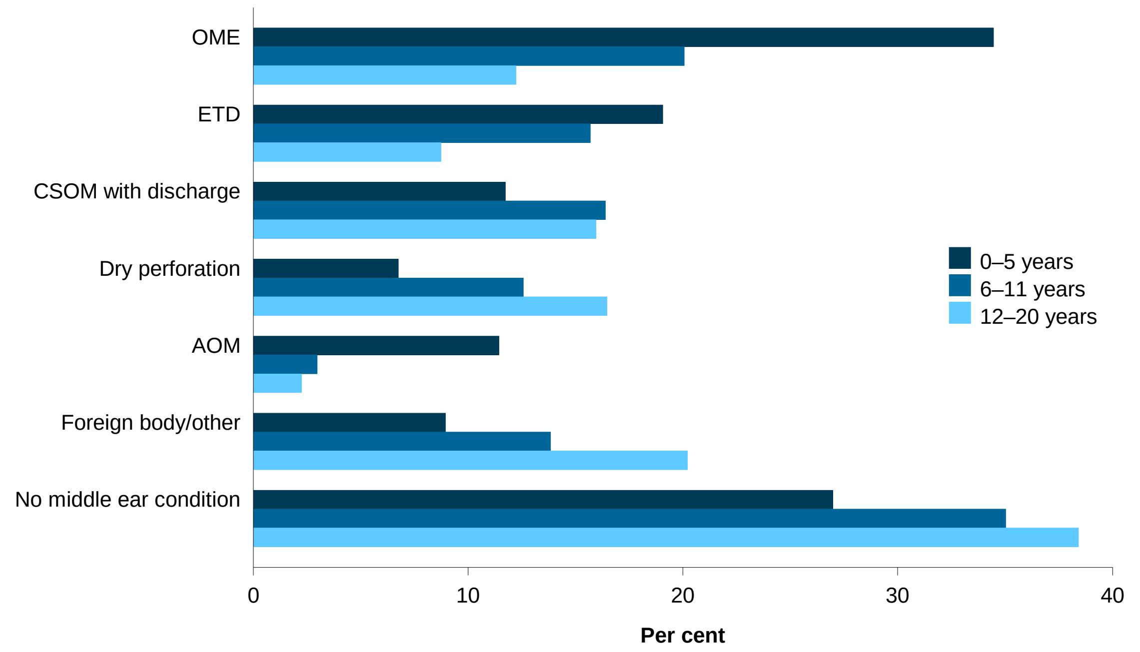
By age

The prevalence of most conditions was highest among younger children. In 2013–14, 73% of children aged 0–5 had at least 1 type of middle ear condition compared with 65% of those aged 6–11, and 62% of those aged 12–20 (Figure 6.2). This reflects the natural profile of ear disease, where children typically grow out of the condition with maturing age (AIHW 2014).

The most common types of middle ear conditions differed slightly between age groups. In 2013–14:

- among children aged 0–5, the most common conditions diagnosed were OME (35% of children), ETD (19%), and CSOM with discharge (12%). Twenty-seven per cent (27%) of children did not have any diagnosed middle ear conditions
- among children aged 6–11, the most common conditions diagnosed were OME (20%), and ETD and CSOM with discharge (both 16%), while 35% had no middle ear conditions
- among young people aged 12–20, the most common conditions were dry perforation (17%), CSOM with discharge (16%) and OME (12%).

Between 2012–13 and 2013–14, the proportion of children aged 0–5 diagnosed with a middle ear condition decreased slightly (from 76% to 73%), while there were increases among children aged 6–11 (55% to 65%) and young people aged 12 and over (49% to 62%) (Table A6.2).



Note: Data are reported only for children and young people where consent was obtained.

Source: Appendix Table A6.2.

Figure 6.2: Type of middle ear conditions among children and young people who received an audiology or ENT service, by age, 2013–14

By sex

In 2013–14, a slightly lower proportion of males than females were diagnosed with at least 1 type of middle ear condition (66% and 69%, respectively) (Table A6.1). This was a change from 2012–13, in which a larger proportion of males had middle ear conditions (63%) than females (59%). In 2013–14, the prevalence of different middle ear conditions was generally similar between sexes.

Patterns in middle ear conditions by sex were generally similar for 2012–13 and 2013–14, except for an increase in the proportion of females diagnosed with OME (from 19% to 23%) (Table A6.1).

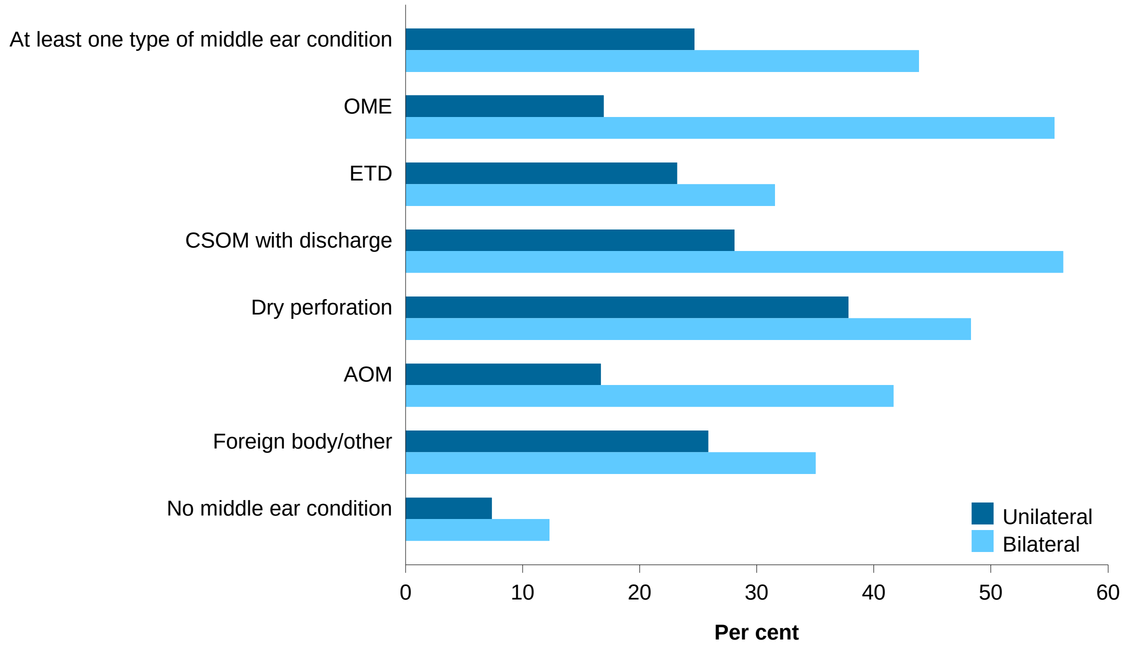
6.2 Hearing loss and impairment in children and young people with middle ear conditions

In 2013–14, out of about 1,200 children and young people diagnosed with a least 1 middle ear condition, 69% experienced hearing loss (44% with bilateral and 25% with unilateral hearing loss), and 19% had no hearing loss (and 13% no data). Hearing loss was experienced by 20% of children and young people who did not have any middle ear conditions at the time of receiving services (Appendix Table A6.3).

As shown in Figure 6.3, hearing loss status varied by the type of middle ear condition diagnosed. Rates of hearing loss were highest among children and young people with dry perforation (86%—48% bilateral and 38% unilateral), CSOM with discharge (84%—56%

bilateral and 28% unilateral) and OME (72%—55% bilateral and 17% unilateral). Rates of hearing loss were 50% and above for other types of middle ear conditions.

Between 2012–13 and 2013–14, the proportion of children and young people with a middle ear condition who had hearing loss increased (from 54% to 69%) (Appendix Table A6.3).



Note: Data are reported only for children and young people where consent was obtained.

Source: Appendix Table A6.3.

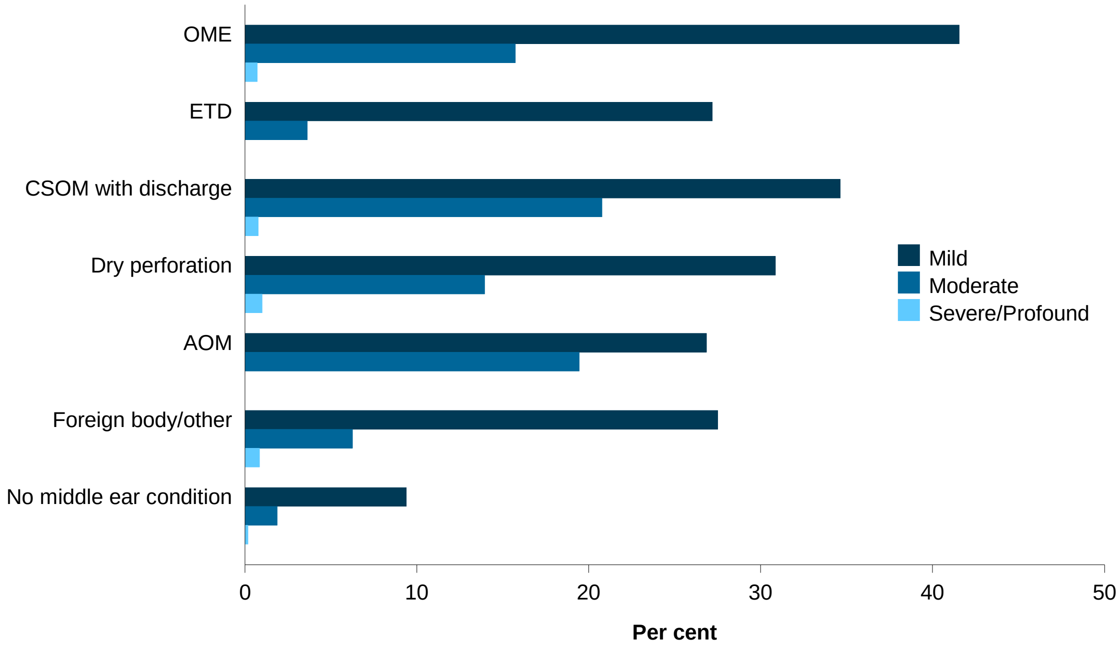
Figure 6.3: Hearing loss status by middle ear condition among children and young people who received an audiology or ENT service, 2013–14

Degrees of hearing impairment also differed between middle ear conditions diagnosed. In 2013–14, among children and young people with at least 1 middle ear condition, 45% had a hearing impairment—31% mild impairment and 13% moderate. In comparison, hearing impairment was present in about 11% of children and young people who did not have any middle ear conditions at the time of receiving services (Figure 6.4).

Hearing impairment was most common in 2013–14 among children and young people diagnosed with OME (58%), CSOM with discharge (56%), and AOM and dry perforation (both 46%). 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 21% of children and young people with CSOM with discharge, and 19% of children and young people with AOM. Hearing impairment was least common among children and young people diagnosed with ETD (31%).

In 2013–14, 45% of children and young people with at least 1 type of middle ear condition were found to have no hearing impairment. In contrast, 76% of those with no middle ear condition had no hearing impairment (Appendix Table A6.4).

Between 2012–13 and 2013–14, the proportion of children and young people with a hearing impairment increased from 38% to 45% among those with a middle ear condition. For most types of conditions, the proportion of children and young people with hearing impairment increased between the financial years—from 21% to 31% for ETD, 37% to 46% for dry perforation, and 51% to 58% for OME. However, there was a decrease among those diagnosed with AOM, from 58% to 46% (Appendix Table A6.4).



Note: Data are reported only for children and young people where consent was obtained.

Source: Appendix Table A6.4.

Figure 6.4: Degree of hearing impairment by middle ear condition among children and young people who received an audiology or ENT service, 2013–14

6.3 Changes in middle ear conditions during treatment

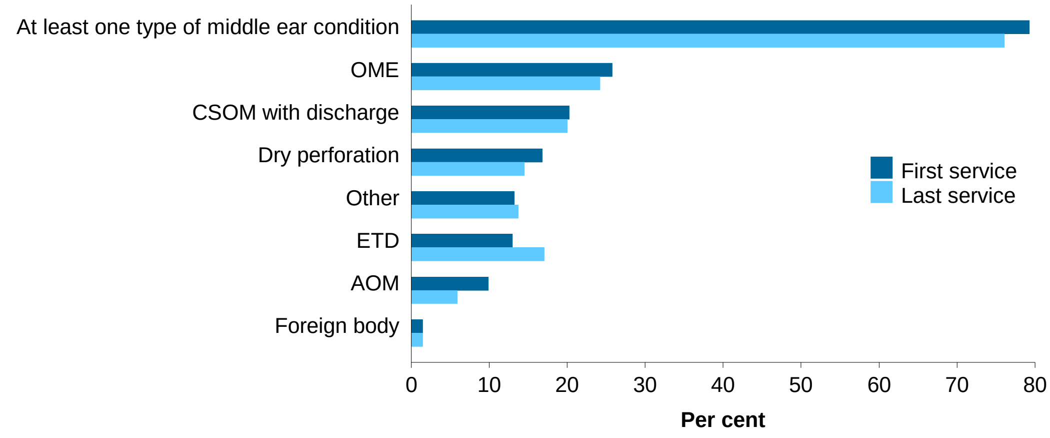
Children and young people who received at least 2 ENT or audiology services—July 2012 to June 2014

This section assesses whether the prevalence of middle 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 2014). In order to measure change over time, this analysis includes only children and young people with a minimum time interval of 3 months between the first and last service. This interval is required in order to observe the outcomes of treatment.

Figure 6.5 (based on Appendix Table A6.5) shows that out of about 781 children and young people who received 2 or more audiology or ENT services between July 2012 and June 2014, the proportion diagnosed with at least 1 middle ear condition decreased by 3 percentage points between the first and last service (from 79% to 76%). However, there was wide variation in the extent of change over time between different types of middle ear conditions:

- There were decreases in the proportions of children and young people diagnosed with AOM (from 10% to 6%) and dry perforation (from 17% to 15%).

- The proportion of those diagnosed with ETD increased (from 13% to 17%).
- There was little change in rates between the first and last service for OME, CSOM with discharge, foreign body, and other middle ear conditions (which include grommets, reduced ear drum movement or retracted ear drum, or other ear condition).
- The proportion of children and young people with no middle ear conditions increased from 21% to 24% (Appendix Table A6.5).



Notes

1. 'Other' includes grommets, reduced ear drum movement or retracted ear drum, or other ear conditions.
2. Data are reported only for children and young people where consent was obtained.

Source: Appendix Table A6.5.

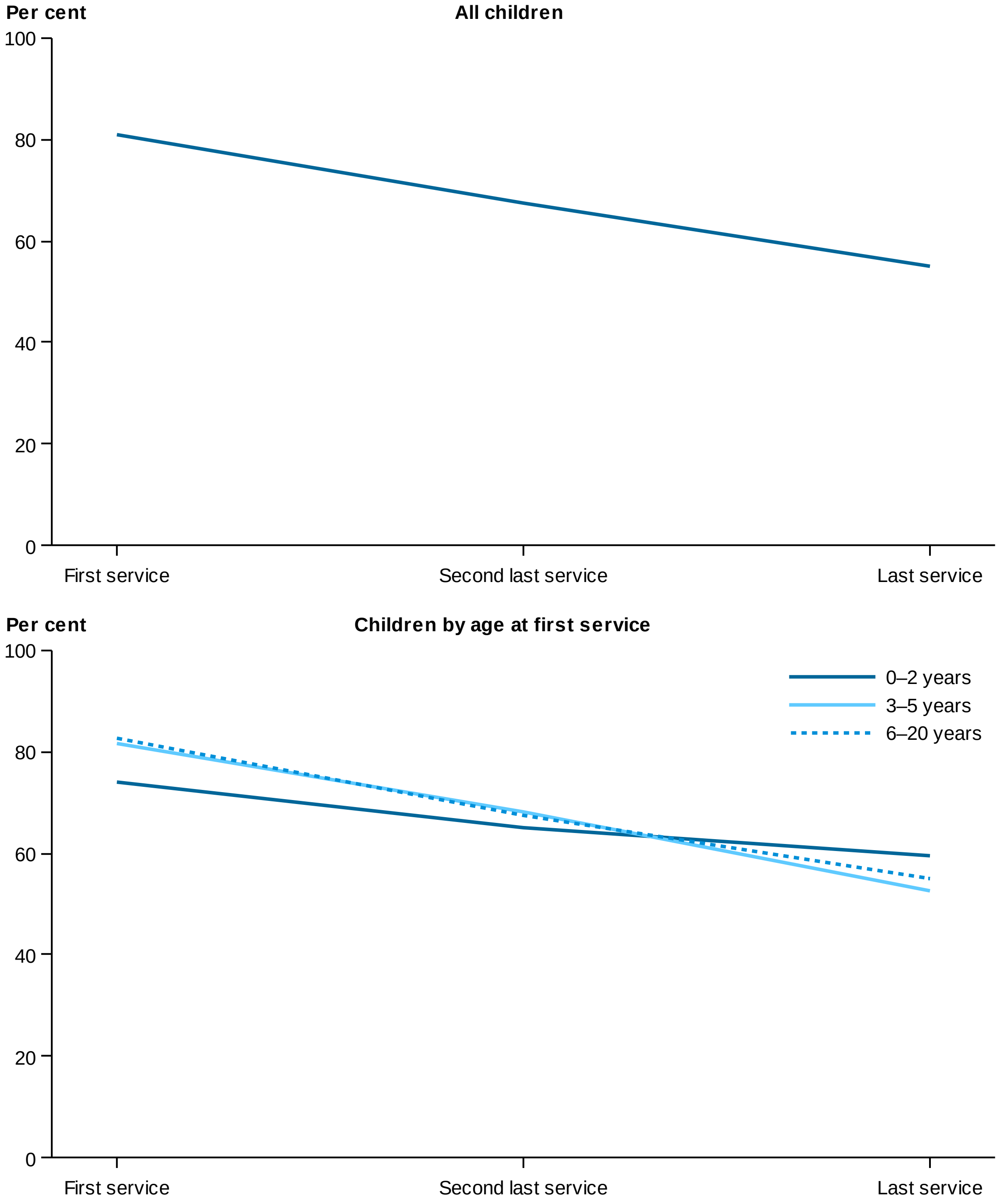
Figure 6.5: Change in prevalence of middle ear conditions between first and last hearing health service, July 2012 to June 2014

Children and young people who received at least 3 ENT or audiology services—August 2007 to June 2014

Figure 6.6 shows changes in the proportion of children and young people with some form of otitis media (that is, AOM, CSOM with discharge, OME or dry perforation) among those who received at least 3 ENT or audiology services between August 2007 and June 2014. Among about 1,370 children and young people analysed, 81% had at least 1 type of otitis media at their first service. This decreased to 67% at the second last service, and to 55% at the last service—an overall decrease of 26 percentage points between the first and last service.

Between age groups, patterns in otitis media rates between services were similar, with the proportions decreasing for all groups. The change in rates between the first and last service was larger among those aged 3–5 and 6–20 than among children aged 0–2 (Figure 6.6).

- Among children aged 0–2, the proportion with otitis media was 74% at the first service, 65% at the second last service and 60% at the last service—a decrease of 14 percentage points.
- Among children aged 3–5, the proportion with otitis media was 82% at the first service, 68% at second last service and 53% at last service—a decrease of 29 percentage points.
- Among young people aged 6–20, the proportion with otitis media was 83% at the first service, 68% at the second last service and 55% at the last service—a decrease of 28 percentage points (Figure 6.3).



Notes

1. Includes children who received 3 or more audiology and/or ENT services between July 2012 and June 2014. Excludes children 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: 17 months. Median time interval between the second last and last service: 11 months.
3. Data are reported only for children where consent was obtained.

Source: Appendix Table A6.6.

Figure 6.6: Proportion of children and young people with OME, CSOM with discharge, AOM or dry perforation at first hearing health outreach service, second last service and last service (among those who received 3 or more services), August 2007 to June 2014

6.4 Disease progression for children and young people with chronic otitis media

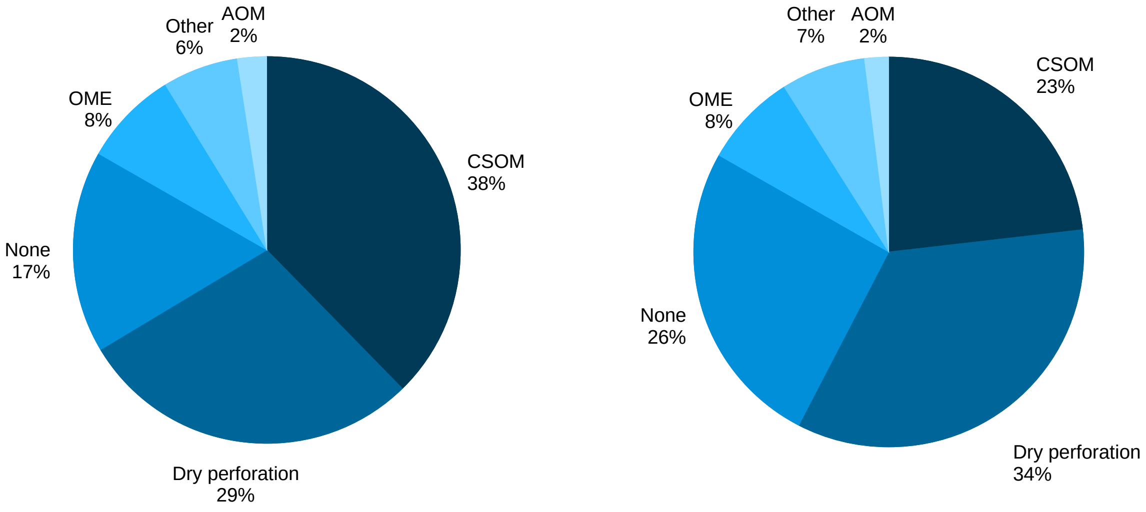
This section examines the progress of children and young people with chronic otitis media (that is, CSOM with discharge and dry perforation). Between August 2007 and March 2014, there were about 1,990 children and young people who received audiology or ENT services with a diagnosis of CSOM with discharge (883) and dry perforation (1,110). By the end of June 2014, 56% of children and young people with CSOM with discharge and 59% of those with dry perforation had received another service at least 3 months after their initial diagnosis.

Figure 6.7 shows that among the children and young people who were diagnosed with CSOM with discharge at an initial ENT or audiology service, 17% had no ear disease at their latest service. However, most of the children and young people still experienced ear disease at their latest check—38% still had CSOM with discharge, while 29% had developed dry perforation, 8% OME and 2% AOM (Figure 6.7[a]).

Among the children and young people who were diagnosed with dry perforation at an initial ENT or audiology service, 26% had no ear disease at their latest check. However, over one-third (35%) still had dry perforation at their latest check, while 23% had developed CSOM with discharge, 8% OME and 2% AOM (Figure 6.7[b]).

Although there were some improvements among both groups analysed, overall, the results generally suggest poor progress in children and young people diagnosed with CSOM with discharge or dry perforation 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 above information, 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 diagnosed with CSOM with discharge at initial service (*n* = 491)

(b) Ear conditions at last service among children and young people diagnosed with dry perforation at initial service (*n* = 656)

Notes

1. ‘Initial service’ refers to the initial service at which a child or young person was diagnosed with CSOM with discharge or dry perforation, which is not necessarily the service recipient’s first audiology or ENT service.
2. Minimum time between services: 3 months. Median time interval between the initial and last service: 32 months. Maximum time interval between the initial and last service: 71 months.
3. 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.
4. Data are reported only for children and young people where consent was obtained.

Source: AIHW analysis of SFNT audiology and ENT data collections as at 1 August 2014 for services provided between 1 August 2007 and 30 June 2014.

Figure 6.7: Progress of children and young people with ear conditions between the initial and last service, August 2007 to June 2014

7 SFNT Audiology performance benchmarks

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 and children to whom services were provided) (Section 7.1), as well as on outcomes in ear and hearing health (Section 7.2).

7.1 Service delivery

The SFNT program aimed to provide 1,700 audiology services per financial year. In the first two years of the program, this target was surpassed, with 1,814 audiology checks delivered in 2012–13 and 1,966 in 2013–14 (Table 7.1).

Table 7.1: Number of audiology checks, 2012–13 and 2013–14

Year	Number of audiology checks	Target
2012–13	1,814	1,700
2013–14	1,966	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 2014).

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 either year of the SFNT program. However, there was an improvement over time—in 2012–13, 504 children were visited by CHHCs, and this increased to 675 children in 2013–14 (Table 7.2).

Table 7.2: Number of children who received services from hearing health coordinators, 2012–13 and 2013–14

Year	Number of children	Target
2012–13	504	700
2013–14	675	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 2014).

7.2 Outcomes

It is important to measure the impact of the SFNT hearing health program in terms of not only service delivery but also the ear and hearing health of children who received services. Targets for hearing impairment and improvement have been set for 2014–15, and the numbers reported here are provided to indicate current progress towards these goals. Table 7.3 shows the 2014–15 outcome targets, and results achieved so far in 2012–13 and 2013–14.

Hearing impairment

The 2014–15 target for the proportion of children who receive audiology services with moderate and severe conductive hearing impairment is 11% or less. In both 2012–13 and 2013–14 the proportion of children with moderate and severe conductive hearing impairment was 10% (Table 7.3).

The 2014–15 targets for hearing improvement are to have 46% or more of children aged 0–5 with improved hearing (defined as a movement to a less severe hearing impairment category), and 55% or more of children aged 6–15 with improved hearing. Among children aged 0–5, 38% had improved hearing in 2012–13; this increased to 78% in 2013–14. Among young people aged 6–15, 67% had improved hearing in 2012–13; this decreased to 50% in 2013–14.

Middle ear conditions

The 2014–15 target for the proportion of children with CSOM with discharge is 15% or less of children aged 0–5 and 12% or less of young people aged 6–15. Among children aged 0–5, the proportion of children with CSOM with discharge was 6% in 2012–13 and 5% in 2013–14. Among young people aged 6–15, these respective proportions were 7% and 9% (Table 7.3).

The 2014–15 target for the proportion of children with dry perforation is 9% or less of children aged 0–5 and 18% or less of young people aged 6–15. Among children aged 0–5, the proportion of children with dry perforation was 4% in 2012–13 and 3% in 2013–14. Among young people aged 6–15, the proportions were 8% in both years (Table 7.3).

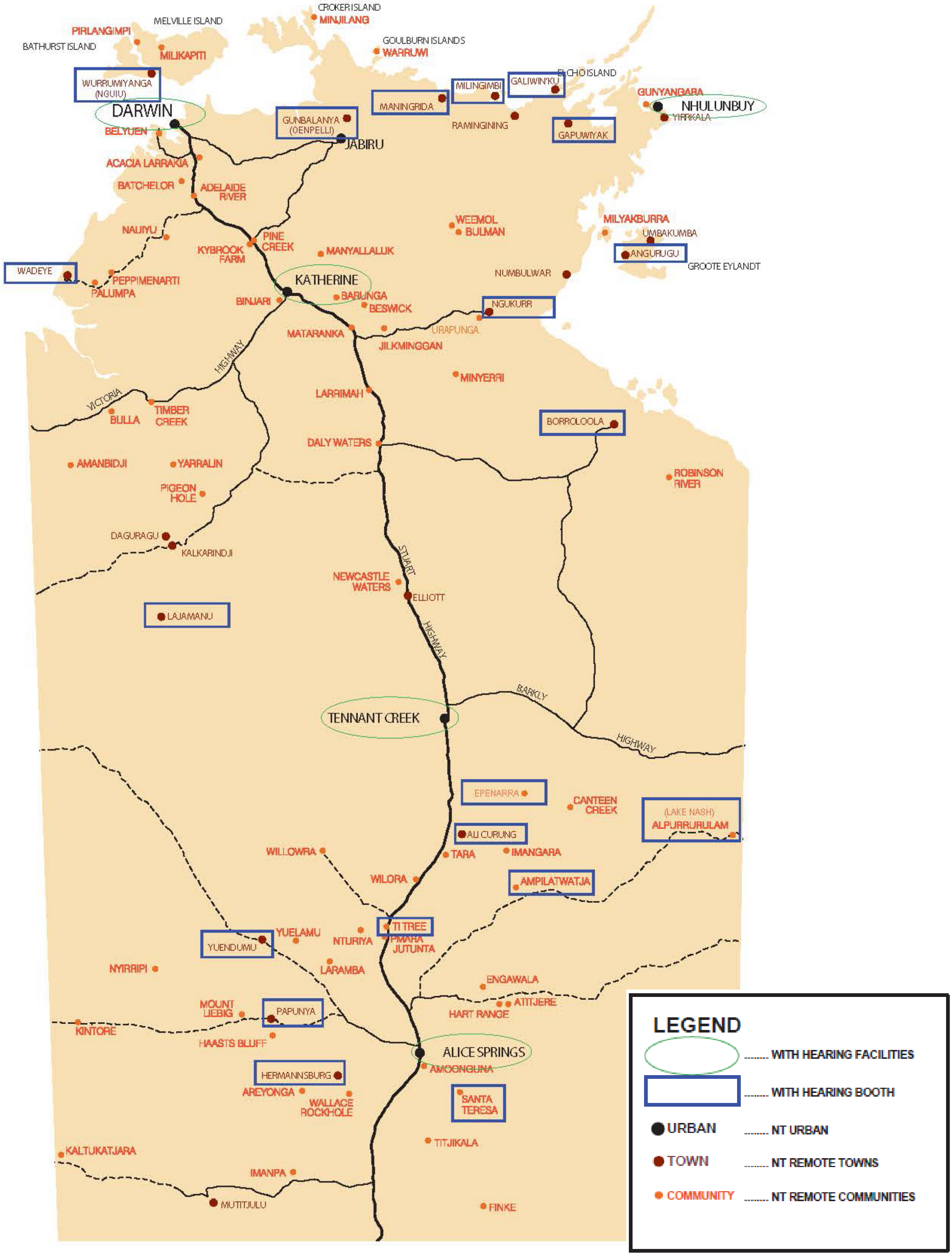
Table 7.3: Progress towards 2014–15 targets for hearing impairment, improved hearing, CSOM with discharge, and dry perforation among children who received SFNT audiology services, 2012–13 and 2013–14

	Outcomes (%)		Target (%) (for 2014–15)
	2012–13	2013–14	
Children with moderate and severe conductive hearing impairment			
All ages	10.1	9.5	<=11
Children with improved hearing[(a)]			
0–5 years	37.5	77.8	>=46
6–15 years	66.7	50.0	>=55
Children with CSOM with discharge			
0–5 years	5.9	5.3	<=15
6–15 years	7.4	9.0	<=12
Children with dry perforation			
0–5 years	3.5	2.9	<=9
6–15 years	8.4	8.1	<=18

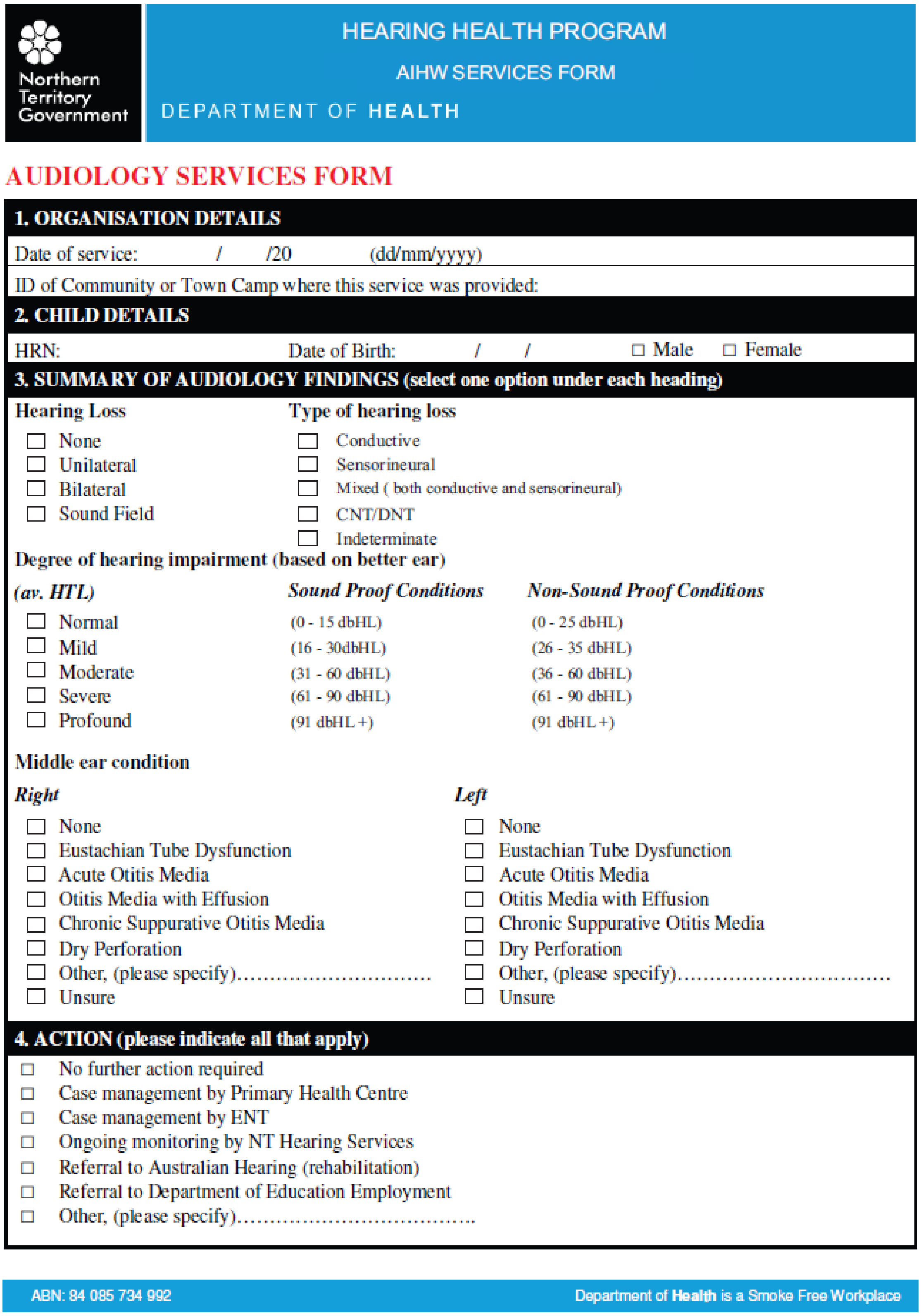
(a) Defined as a movement to a less severe hearing impairment category, for example, from moderate to mild.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Appendix A: Hearing facility locations in the Northern Territory



Appendix B: 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	***Left***
☐ None	☐ None
☐ Eustachian Tube Dysfunction	☐ Eustachian Tube Dysfunction
☐ Acute Otitis Media	☐ Acute Otitis Media
☐ Otitis Media with Effusion	☐ Otitis Media with Effusion
☐ Chronic Suppurative Otitis Media	☐ Chronic Suppurative Otitis Media
☐ Dry Perforation	☐ Dry Perforation
☐ Other, (please specify)............................	☐ Other, (please specify)................................
☐ Unsure	☐ 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)..................................

ABN: 84 085 734 992

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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:

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……………………………………	☐	☐

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	☐	

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 ☐ Moist (serous) ☐ **DRY** ☐ Squamous ☐ 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 ☐ Moist (serous) ☐ **DRY** ☐ Squamous ☐ 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 dry perforation)		
OME		
Foreign Body		
Other		

Insufficient information for Dx

☐ Needs teleotology review

☐ Needs ENT F2F

Comment:

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:	Hearing aid: 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		

Signature: ____________________________

Date: ________/_______/___________

ABN: 84 085 734 992

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Appendix C: Data quality statements

Northern Territory outreach audiology data collection

Summary of key issues

- Children 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 under 21, 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 program.

The SFNT began in July 2012 and provides funding over a decade 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 0–15.

The Healthy Ears—Better Hearing, Better Listening program was mainly used to support outreach audiology services for people aged 16–20. Although all Indigenous children aged up to 21 are eligible to receive these services, they have mainly been delivered by outreach service teams to children in remote areas, as there is a high demand and a lack of local services available in these areas.

Institutional environment

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 data sets based on data from each jurisdiction, to analyse these data sets and to disseminate information and statistics.

The Australian Institute of Health and Welfare Act, in conjunction with compliance to the *Privacy Act 1988* (Cwlth), 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 providing a wide range of health and family services, and delivers 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

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 second annual report has a reference period of 2012–13 and 2013–14; however the scope in this latter report was extended to contain data both on children in the SFNT program (that is, children aged 0–15) and in the Healthy Ears—Better Hearing, Better Listening program (young people aged 16–20). 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 2014, the median lag between services being provided and records being entered into AIHW's database was about 2 weeks for outreach audiology services.

Accessibility

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

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

Interpretability

To assist stakeholders in interpreting 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

Children 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 under 16 under the SFNT program, not all eligible children 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 in the Northern Territory.

Services are targeted at children in most need. In January 2013, the NT DoH implemented the use of priority listing categories, so children 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 program 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 who receive outreach audiology services funded through the SFNT and the Healthy Ears—Better Hearing, Better Listening program. Under the SFNT, all Indigenous children in the Northern Territory under the age of 16 are eligible for services. In addition, under the Healthy Ears—Better Hearing, Better Listening program, children and young people aged up to 21 are able to receive services. The outreach audiology data collection includes information on demographic information for children 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

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

To obtain unit record data for the AIHW audiology 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. 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 2014, the median lag between outreach audiology services being provided and records being entered into AIHW's database was about 2 weeks.

Coherence

The scope of the hearing health report published by AIHW in February 2015 extends on that of previous reports by the AIHW on hearing health programs for children in the Northern Territory, which focused only on services provided under SFNT (that is, for children aged under 16). The report published in February 2015 contains data from SFNT services, as well as data on services provided to children aged 16–20 under the Healthy Ears—Better Hearing, Better Listening program. Due to differences in the scope of the programs, analyses from previous reports that contain only SFNT program data (for children aged under 16) should not be compared with analyses for children and young people aged 0–20.

Additionally, the 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. Data from the CHCI(CtG) should not be compared with data from the SFNT program. However, 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 the age of 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 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 2014 (58% of services and 61% of children). 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 over a decade 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 aged 0–15.

Institutional environment

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 data sets based on data from each jurisdiction, to analyse these data sets and to disseminate information and statistics.

The Australian Institute of Health and Welfare Act, in conjunction with compliance to the *Privacy Act 1988* (Cwlth), 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 providing a wide range of health and family services, and delivers services related to the ministerial responsibilities of Heath and Senior Territorians. For further information see the NT DoH website <www.health.nt.gov.au>.

Timeliness

The first report on the SFNT CHHC data collection was published in January 2014, with a reference period of July 2012 to June 2013. The second annual report has a reference period of 2012–13 and 2013–14; however the scope in this latter report was extended to contain data both on children in the SFNT program (that is, children aged 0–15) and in the Healthy Ears—Better Hearing, Better Listening program (young people aged 16–20). 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 2014, the median lag between services being provided and records being entered into AIHW's database was about 3 weeks for CHHC services.

Accessibility

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

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

Interpretability

To assist stakeholders in interpreting 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

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, it is important to note that 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 data collection includes information on demographic information for children who received services, ear health (results of otoscopy and tympanometry), middle ear conditions (if any), clinical services provided, and contact with other service providers.

Accuracy

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

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 2014 (58% of services and 61% 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.

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 2014, the median lag between services being provided and records being entered into AIHW's database was about 3 weeks.

Coherence

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 report *Hearing health outreach services to Indigenous children and young people in the Northern Territory: 2012–13 and 2013–14* (published in February 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.

Northern Territory ENT teleotology data collection

Summary of key issues

- Children who receive Ear, Nose and Throat (ENT) teleotology services are not a random sample of Indigenous children in the Northern Territory. Although these services are available to all Indigenous children in the Northern Territory aged under 21, not all eligible children access these services. Additionally, these services are more commonly accessed by children in remote areas. Therefore, results of analyses may not be able to be generalised to all children 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 Project Agreement on Improving Ear Health Services for Indigenous Australian Children. This Agreement supports the delivery of additional surgical services, clinical leadership programs and ENT teleotology services to the Northern Territory (as well as to four other jurisdictions), as part of the broader measure on Improving Eye and Ear Health Services for Indigenous Australians for Better Education and Employment Outcomes. 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 in the Northern Territory aged under 21 are eligible for ENT teleotology services. The data collection includes demographic information of children who received services, 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 in remote areas, where the high demand for ENT face-to-face consultations is difficult to meet high due to a lack of resources.

Institutional environment

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 data sets based on data from each jurisdiction, to analyse these data sets and disseminate information and statistics.

The Australian Institute of Health and Welfare Act, in conjunction with compliance to the *Privacy Act 1988* (Cwlth), 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 providing a wide range of health and family services, and delivers services related to the ministerial responsibilities of Heath and Senior Territorians. For further information see the NT DoH website <www.health.nt.gov.au>.

Timeliness

The first report by the AIHW 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 Project Agreement on Improving Ear Health Services for Indigenous Australian Children from July 2012 to June 2014 was published in February 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 ENT teleotology data collection. From July 2012 to June 2014, the median lag between ENT teleotology services being provided and records being entered into AIHW’s database was about 14 weeks.

Accessibility

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 the NT DoH and the Department of Health. In addition, approvals from relevant ethics committees of the Northern Territory may be required.

Interpretability

To assist stakeholders in interpreting 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.

A copy of the Project Agreement on Improving Ear Health Services for Indigenous Australian Children is available on the website of the Standing Council on Federal Financial Relations <http://www.federalfinancialrelations.gov.au/>.

Relevance

The ENT teleotology collection captures data on children who receive ENT teleotology services funded through the Project Agreement on Improving Ear Health Services for Indigenous Australian Children. It is important to note that 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 in the Northern Territory.

- Children who receive ENT teleotology services are not a random sample of Indigenous children in the Northern Territory. Although services are available to all Indigenous children aged 20 or younger, not all eligible children access these services.
- ENT teleotology services are more commonly accessed by children in remote areas.
- Services are targeted at children in most need. In 2013, the NT DoH implemented the use of priority listing categories, so children 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 Project Agreement on Improving Ear Health Services for Indigenous Australian Children 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

Health providers use standard forms to record information on ENT teleotology services. The forms were developed by the NT DoH in consultation with the 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 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. The proportion of non-consented data varies over time; however, in general it is around 1% for children who received ENT teleotology 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 ENT teleotology data collection. From July 2012 to June 2014, the median lag between ENT teleotology services being provided and records being entered into the AIHW's database was about 14 weeks.

Coherence

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 the SFNT program. The CHCI(CtG) services were provided to Indigenous children under the age of 16 in prescribed areas of the Northern Territory and targeted at children who had a referral from their initial Northern Territory Emergency Response Child Health Check. The ENT services provided through the Project Agreement on Improving Ear Health Services for Indigenous Australian Children are available to all Indigenous children in the Northern Territory under the age of 21. In 2013, priority listing was implemented, so children in most need of ENT services are more likely to receive them before other children. 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.

Appendix D: Comparison of hearing impairment standards

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 A3.1: Children and young people who received outreach audiology services, by age and sex, 2012–13 and 2013–14

	2012–13		2013–14		Total[(a)]	
Age and sex	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Age (years)						
<1	28	1.7	30	1.7	51	1.8
1–2	203	12.3	186	10.7	315	11.0
3–5	418	25.4	445	25.5	693	24.3
6–10	595	36.2	590	33.8	994	34.8
11–15	288	17.5	354	20.3	578	20.3
16–20	113	6.9	138	7.9	223	7.8
Total	**1,645**	**100.0**	**1,743**	**100.0**	**2,854**	**100.0**
Sex						
Male	820	49.8	860	49.3	1,427	50.0
Female	825	50.2	883	50.7	1,427	50.0
Total	**1,645**	**100.0**	**1,743**	**100.0**	**2,854**	**100.0**

(a) Total includes all children and young people who received audiology services from 1 July 2012 to 30 June 2014. 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/young people may have received services in both financial years.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Table A3.2: Hearing status[(a)(b)] by age, children and young people who received outreach audiology services, 2012–13 and 2013–14

Age group (years)	Number of people who received an audiology service	Number of people with hearing loss	Per cent with hearing loss
2012–13			
<1	28	13	46.4
1–2	203	87	42.9
3–5	418	231	55.3
6–10	595	308	51.8
11–15	288	144	50.0
16–20	113	67	59.3
Total	**1,645**	**850**	**51.7**
2013–14			
<1	30	10	33.3
1–2	186	88	47.3
3–5	445	262	58.9
6–10	590	344	58.3
11–15	354	174	49.2
16–20	138	85	61.6
Total	**1,743**	**963**	**55.2**
Total(c)			
<1	51	18	35.3
1–2	315	146	46.3
3–5	693	382	55.1
6–10	994	512	51.5
11–15	578	264	45.7
16–20	223	131	58.7
Total	**2,854**	**1,453**	**50.9**

(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 2014. 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/young people may have received services in both financial years.

Note: Data are reported only for children and young people where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Table A3.3: Type of hearing loss[(a)], children and young people who received outreach audiology services, 2012–13 and 2013–14

	2012–13		2013–14		Total[(b)]	
Type of hearing loss	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Children and young people with hearing loss	850	51.7	963	55.2	1,453	50.9
Conductive	658	40.0	643	36.9	1,015	35.6
Sensorineural	18	1.1	24	1.4	39	1.4
Mixed	28	1.7	21	1.2	33	1.2
Type of hearing loss missing/not tested	146	8.9	275	15.8	366	12.8
No hearing loss	587	35.7	616	35.3	1,107	38.8
Hearing loss missing[(c)]/not tested[(d)]	208	12.6	164	9.4	294	10.3
Total service recipients	**1,645**	**100.0**	**1,743**	**100.0**	**2,854**	**100.0**

(a) 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 2014. 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/young people may have received services in both 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 for children and young people where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Table A3.4: Degree of hearing impairment[(a)], children and young people who received outreach audiology services, 2012–13 and 2013–14

	2012–13		2013–14		Total[(b)]	
Degree of hearing impairment	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Children and young people with hearing impairment	537	32.6	595	34.1	898	31.5
Mild	374	22.7	420	24.1	637	22.3
Moderate	156	9.5	168	9.6	251	8.8
Severe/profound	7	0.4	7	0.4	10	0.4
No hearing impairment	895	54.4	972	55.8	1,649	57.8
Missing[(c)]/Not tested[(d)]	213	12.9	176	10.1	307	10.8
Total service recipients	**1,645**	**100.0**	**1,743**	**100.0**	**2,854**	**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 2014. 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/young people may have received services in both 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 for children and young people where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Table A3.5: Degree of hearing impairment[a][b], by age, children and young people who received outreach audiology services, 2012–13 and 2013–14

		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									
0–2[d]	231	37	16.0	38	16.5	48	20.8	108	46.8
3–5	418	177	42.3	114	27.3	55	13.2	72	17.2
6–10	595	402	67.6	142	23.9	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	**1,645**	**895**	**54.4**	**374**	**22.7**	**163**	**9.9**	**213**	**12.9**
2013–14									
0–2[d]	216	33	15.3	38	17.6	42	19.4	103	47.7
3–5	445	211	47.4	134	30.1	47	10.6	53	11.9
6–10	590	371	62.9	154	26.1	52	8.8	13	2.2
11–15	354	267	75.4	70	19.8	12	3.4	5	1.4
16–20	138	90	65.2	24	17.4	22	15.9	2	1.4
Total	**1,743**	**972**	**55.8**	**420**	**24.1**	**175**	**10.0**	**176**	**10.1**
Total[e]									
0–2[d]	366	58	15.8	63	17.2	74	20.2	171	46.7
3–5	693	328	47.3	202	29.1	71	10.2	92	13.3
6–10	994	674	67.8	228	22.9	69	6.9	23	2.3
11–15	578	438	75.8	101	17.5	24	4.2	15	2.6
16–20	223	151	67.7	43	19.3	23	10.3	6	2.7
Total	**2,854**	**1,649**	**57.8**	**637**	**22.3**	**261**	**9.1**	**307**	**10.8**

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

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

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

(d) The age groups <1 and 1–2 years have been combined as 0–2 years due to small numbers.

(e) Total includes all children and young people who received audiology services from 1 July 2012 to 30 June 2014. 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/young people may have received services in both financial years.

Note: Data are reported only for children and young people where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Table A3.6: Type of actions required, children and young people who received outreach audiology services, 2012–13 and 2013–14

	No hearing loss		Hearing loss		Missing[(a)]		Total	
Type of further action required	**No.**	**Per cent**	**No.**	**Per cent**	**No.**	**Per cent**	**No.**	**Per cent**
2012–13								
At least 1 further action required[(b)]	170	28.9	825	97.1	194	93.3	1,189	72.2
Ongoing monitoring by NT Hearing Services	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 and 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 1 further action required[(b)]	152	24.7	905	94.0	150	91.5	1,207	69.2
Ongoing monitoring by NT Hearing Services	125	20.3	755	78.4	141	86.0	1,021	58.6
Case management by primary health centre	37	6.0	214	22.2	41	25.0	292	16.8
Case management by ENT	28	4.5	243	25.2	26	15.9	297	17.0
Referral to Department of Education Employment and Training	2	0.3	77	8.0	6	3.7	85	4.9
Referral to Australian Hearing	1	0.2	124	12.9	8	4.9	133	7.6
Other	3	0.5	14	1.5	—	—	17	1.0
No action required	464	75.3	47	4.9	11	6.7	522	29.9
Total service recipients	**616**	**100.0**	**963**	**100.0**	**164**	**100.0**	**1,743**	**100.0**
Total[(c)]								
At least 1 further action required[(b)]	275	24.8	1,376	94.7	268	91.2	1,919	67.2
Ongoing monitoring by NT Hearing Services	220	19.9	1,165	80.2	245	83.3	1,630	57.1
Case management by primary health centre	68	6.1	362	24.9	87	29.6	517	18.1
Case management by ENT	59	5.3	447	30.8	43	14.6	549	19.2
Referral to Department of Education Employment and Training	3	0.3	113	7.8	6	2.0	122	4.3
Referral to Australian Hearing	1	0.1	183	12.6	14	4.8	198	6.9
Other	7	0.6	30	2.1	1	0.3	38	1.3

(continued)

Table A3.6 (continued): Type of actions required, children and young people who received outreach audiology services, 2012–13 and 2013–14

	No hearing loss		Hearing loss		Missing[(a)]		Total	
Type of further action required	**No.**	**Per cent**	**No.**	**Per cent**	**No.**	**Per cent**	**No.**	**Per cent**
No action required	833	75.2	65	4.5	22	7.5	920	32.2
Total service recipients	**1,108**	**100.0**	**1,453**	**100.0**	**294**	**100.0**	**2,855**	**100.0**

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

(b) Children and young people 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 2014. 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/young people may have received services in both financial years.

Notes

1. Data are reported only for children and young people 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 2014).

Table A3.7: Change in hearing status, children and young people who received at least 2 outreach audiology services[(a)], July 2012 to June 2014

	First audiology service		Last 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)]	498	79.8	415	66.5	–16.7	–13.3
Unilateral	149	23.9	150	24.0	0.7	0.2
Bilateral	349	55.9	265	42.5	–24.1	–13.5
No hearing loss	126	20.2	209	33.5	65.9	13.3
Total children[(e)]	**624**	**100.0**	**624**	**100.0**	. .	. .

(a) Median time between the first and second service: 9 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 with missing or not tested responses for hearing status.

Note: Data are reported only for children and young people where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Table A3.8: 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, July 2012 to June 2014

		First service		Second last service		Last service	
Age group (years)	**Total number of service recipients**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
0–5	435	374	86.0	326	74.9	268	61.6
6–20	662	545	82.3	485	73.3	400	60.4
Total	**1,097**	**919**	**83.8**	**811**	**73.9**	**668**	**60.9**

Notes

1. Minimum time interval between first and last service: 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 status.
3. Data are reported only for children and young people where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Table A3.9: 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), July 2012 to June 2014

	First service		Second last service		Last service	
Hearing impairment	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
None	467	42.6	616	56.2	716	65.3
Mild	375	34.2	354	32.3	294	26.8
Moderate/severe/profound	255	23.2	127	11.6	87	7.9
Total	**1,097**	**100.0**	**1,097**	**100.0**	**1,097**	**100.0**

Notes

1. Minimum time interval between first and last service: 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 status.
3. Data are reported only for children and young people where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Table A3.10: 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), children aged 0–5, July 2012 to June 2014

	First service		Second last service		Last service	
Degree of hearing impairment	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
None	125	28.9	211	48.8	273	63.2
Mild	174	40.3	160	37.0	126	29.2
Moderate/severe/profound	133	30.8	61	14.1	33	7.6
Total	**432**	**100.0**	**432**	**100.0**	**432**	**100.0**

Notes

1. Minimum time interval between first and last service: 3 months.
2. Includes Indigenous children who received 3 or more outreach audiology services, aged 0–5. Excludes children with missing or not tested responses for hearing status.
3. Data are reported only for children where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Table A3.11: 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), children and young people aged 6–20, July 2012 to June 2014

	First service		Second last service		Last service	
Degree of hearing impairment	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
None	342	51.4	405	60.9	443	66.6
Mild	201	30.2	194	29.2	168	25.3
Moderate/severe/profound	122	18.3	66	9.9	54	8.1
Total	**665**	**100.0**	**665**	**100.0**	**665**	**100.0**

Notes

1. Minimum time interval between first and last service: 3 months.
2. Includes Indigenous children and young people who received 3 or more outreach audiology services, aged 6–20 years. Excludes those with missing or not tested responses for hearing status.
3. Data are reported only for children and young people where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology data collection (services provided on or before 30 June 2014).

Table A4.1: Number of children who received CHHC services, by sex and priority listing, 2012–13 and 2013–14

	2012–13		2013–14		Total[(a)]	
	Number	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Sex						
Male	92	45.8	150	48.7	242	47.5
Female	109	54.2	158	51.3	267	52.5
Total	**194**	**100.0**	**286**	**100.0**	**441**	**100.0**
Priority listing[(b)]						
HP1	18	9.0	21	6.8	39	7.7
HP2	62	30.8	97	31.5	159	31.2
HP3	90	44.8	142	46.1	232	45.6
HP4	31	15.4	48	15.6	79	15.5
Total	**194**	**100.0**	**286**	**100.0**	**441**	**100.0**

(a) Total includes all children who received CHHC services from 1 July 2012 to 30 June 2014. 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 both financial years.

(b) Hearing health priority listing status at first visit. See Box 4.1 in Chapter 4 for definitions of categories.

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

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2014).

Table A4.2: Type of clinical services provided at CHHC visits, 2012–13 and 2013–14

	2012–13		2013–14		Total[(a)]	
Clinical services	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Discussed ear health education	193	96.0	302	98.1	495	97.2
Verified diagnosis	171	85.1	282	91.6	453	89.0
Discussed hearing loss minimisation strategies	157	78.1	273	88.6	430	84.5
Supported audiological management	151	75.1	270	87.7	421	82.7
Confirmed regular follow-up and care plan	157	78.1	226	73.4	383	75.2
Discussed treatment adherence strategies	111	55.2	174	56.5	285	56.0
Verified or amended treatment	93	46.3	153	49.7	246	48.3
Supported ENT management	66	32.8	131	42.5	197	38.7
Total visits[(b)]	**201**	**100.0**	**308**	**100.0**	**509**	**100.0**

(a) Total includes all CHHC services from 1 July 2012 to 30 June 2014.

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

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

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2014).

Table A4.3: Contact made with other service providers at CHHC visits, 2012–13 and 2013–14

	2012–13		2013–14		Total[a]	
Service providers	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Health providers	77	38.3	183	59.4	260	51.1
Education providers	103	51.2	203	65.9	306	60.1
Australian Hearing	12	6.0	53	17.2	65	12.8
Community-based workers	20	10.0	62	20.1	82	16.1
Other services	3	1.5	4	1.3	7	1.4
Total visits[b]	**201**	**100.0**	**308**	**100.0**	**509**	**100.0**

(a) Total includes all CHHC services from 1 July 2012 to 30 June 2014.

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

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

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2014).

Table A4.4: Type of middle ear condition, children who received CHHC services, 2012–13 and 2013–14

	2012–13		2013–14		Total[b]	
Type of middle ear condition[a]	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
At least one type of middle ear condition	188	96.9	259	90.6	413	93.7
OME	78	40.2	145	50.7	212	48.1
ETD	14	7.2	40	14.0	53	12.0
CSOM with discharge	46	23.7	61	21.3	103	23.4
Dry perforation	29	14.9	29	10.1	54	12.2
AOM	43	22.2	44	15.4	84	19.0
AOM with perforation	21	10.8	11	3.8	32	7.3
Other	37	19.1	31	10.8	66	15.0
No middle ear condition[c]	6	3.1	27	9.4	32	7.3
Total children[d]	**194**	**100.0**	**286**	**100.0**	**441**	**100.0**

(a) Middle ear condition at first visit.

(b) Total includes all children who received CHHC services from 1 July 2012 to 30 June 2014. It does not equal the sum of the services for financial years, as children may have received services in both financial years.

(c) No middle 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 for children where consent was obtained.

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2014).

Table A4.5: Hearing loss status[a], children in the CHHC and audiology programs[b], 2012–13 and 2013–14

	2012–13		2013–14		Total[c]	
Hearing loss status	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
No hearing loss	28	20.1	37	17.2	65	18.4
Hearing loss[d]	111	79.9	178	82.8	289	81.6
Unilateral	17	12.2	37	17.2	54	15.3
Bilateral	94	67.6	141	65.6	235	66.4
Total children	**139**	**100.0**	**215**	**100.0**	**354**	**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 2014. It does not equal the sum of services for the financial years, as children may have received services in both financial years.

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

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

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2014).

Table A4.6: Degree of hearing impairment[a], children in the CHHC and audiology programs[b], 2012–13 and 2013–14

	2012–13		2013–14		Total[c]	
Degree of hearing impairment	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
No hearing impairment	16	11.5	34	15.8	50	14.1
Hearing impairment	92	66.2	140	65.1	232	65.5
Mild	62	44.6	77	35.8	139	39.3
Moderate/severe/profound	30	21.6	63	29.3	93	26.3
Missing[d]	3	2.2	4	1.9	7	2.0
Total children with hearing loss	111	79.9	178	82.8	289	81.6
Children without hearing loss	28	20.1	37	17.2	65	18.4
Total children tested for hearing loss[e]	**139**	**100.0**	**215**	**100.0**	**354**	**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 2014. It does not equal the sum of services for the financial years, as children may have received services in both 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 for children where consent was obtained.

Source: AIHW analysis of CHHC data collection (services provided on or before 30 June 2014).

Table A5.1: Number of children and young people who received an ENT service, by age and sex, 2012–13 and 2013–14

	2012–13		2013–14		Total[(a)]	
	Number	Per cent	Number	Per cent	Number	Per cent
Age[(b)]						
0–5	164	22.7	193	25.7	302	23.9
6–11	369	51.0	351	46.7	607	48.0
12–15	114	15.8	129	17.2	221	17.5
16 and over	76	10.5	79	10.5	135	10.7
Total	**723**	**100.0**	**752**	**100.0**	**1,265**	**100.0**
Sex						
Male	340	47.0	348	46.3	604	47.7
Female	383	53.0	404	53.7	661	52.3
Total	**723**	**100.0**	**752**	**100.0**	**1,265**	**100.0**

(a) Total includes all children and young people who received ENT services (1 July 2012 to 30 June 2014). 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/young people may have received services in both financial years.

(b) Age based on latest ENT service received.

Notes

1. Data are reported only for children and young people 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 2014).

Table A5.2: Type of treatment recommended at ENT services, 2012–13 and 2013–14

	2012–13		2013–14		Total[(a)]	
Treatment	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Service recipients recommended treatment[(b)]	218	30.2	255	33.9	411	32.5
Medication	209	28.9	231	30.7	378	29.9
Foreign body removed	4	0.6	10	1.3	14	1.1
Aural toilet	76	10.5	107	14.2	170	13.4
Other	1	0.1	12	1.6	13	1.0
Service recipients recommended no treatment	532	73.6	529	70.3	956	75.6
Total service recipients	**723**	**100.0**	**752**	**100.0**	**1,265**	**100.0**

(a) Total includes all children and young people who received ENT services between 1 July 2012 and 30 June 2014. 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/young people may have received services in both 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 more than 1 type of treatment.

Notes

1. Data are reported only for children and young people 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 2014).

Table A5.3: Type of further action recommended for children and young people who received an ENT service, 2012–13 and 2013–14

	2012–13		2013–14		Total[(a)]	
	Number	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Type of further action recommended						
Further follow-up						
Case management by primary health-care services	10	1.4	20	2.7	30	2.4
Audiological assessment	470	65.0	574	76.3	945	74.7
Australian Hearing	14	1.9	22	2.9	36	2.8
ENT review	360	49.8	502	66.8	787	62.2
Total service recipients who had at least 1 type of follow-up recommended	*513*	*71.0*	*613*	*81.5*	*1,005*	*79.4*
Surgery recommended						
Myringoplasty	178	24.6	183	24.3	304	24.0
Myringotomy	35	4.8	32	4.3	60	4.7
Adenoidectomy	39	5.4	54	7.2	85	6.7
Grommets	12	1.7	21	2.8	33	2.6
Examination under anaesthetic	8	1.1	14	1.9	22	1.7
Removal of tubes	1	0.1	1	0.1	2	0.2
Other procedure	5	0.7	1	0.1	6	0.5
Total service recipients who had at least one surgery recommended(b)	*232*	*32.1*	*241*	*32.0*	*408*	*32.3*
Total service recipients who received at least 1 recommendation for further action	*606*	*83.8*	*671*	*89.2*	*1,094*	*86.5*
Total service recipients	**723**	**100.0**	**752**	**100.0**	**1,265**	**100.0**

(a) Total includes all children and young people who received ENT services between 1 July 2012 and 30 June 2014. 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/young people may have received services in both financial years.

(b) This is a multiple-response item. The sum does not add up to the total because one surgery can involve multiple procedures.

Notes

1. Data are only reported for children and young people where consent was obtained.
2. Services include only those that were provided through the ENT program.

Source: AIHW analysis of ENT teleotology data collection (services provided on or before 30 June 2014).

Table A6.1: Type of middle ear condition[(a)], children and young people[(b)] who received an audiology or ENT service, by sex, 2012–13 and 2013–14

	Sex					
	Male		Female		Total	
Type of middle ear condition	Number	Per cent	Number	Per cent	Number	Per cent
2012–13						
At least 1 type of middle ear condition	365	63.0	324	58.7	689	60.9
OME	140	24.2	103	18.7	243	21.5
ETD	92	15.9	73	13.2	165	14.6
CSOM with discharge	51	8.8	51	9.2	102	9.0
Dry perforation	53	9.2	57	10.3	110	9.7
AOM	36	6.2	33	6.0	69	6.1
Foreign body/other	80	13.8	88	15.9	168	14.9
No middle ear condition(c)	214	37.0	228	41.3	442	39.1
Total service recipients	**579**	**100.0**	**552**	**100.0**	**1,131**	**100.0**
2013–14						
At least 1 type of middle ear condition	582	66.0	623	68.5	1,205	67.3
OME	218	24.7	208	22.9	426	23.8
ETD	148	16.8	128	14.1	276	15.4
CSOM with discharge	123	13.9	137	15.1	260	14.5
Dry perforation	100	11.3	101	11.1	201	11.2
AOM	50	5.7	58	6.4	108	6.0
Foreign body/other	99	11.2	141	15.5	240	13.4
No middle ear condition(c)	300	34.0	286	31.5	586	32.7
Total service recipients	**882**	**100.0**	**909**	**100.0**	**1,791**	**100.0**
Total(d)						
At least 1 type of middle ear condition	947	64.8	947	64.8	1,894	64.8
OME	358	24.5	311	21.3	669	22.9
ETD	240	16.4	201	13.8	441	15.1
CSOM with discharge	174	11.9	188	12.9	362	12.4
Dry perforation	153	10.5	158	10.8	311	10.6
AOM	86	5.9	91	6.2	177	6.1
Foreign body/other	179	12.3	229	15.7	408	14.0
No middle ear condition(c)	514	35.2	514	35.2	1,028	35.2
Total service recipients	**1,461**	**100.0**	**1,461**	**100.0**	**2,922**	**100.0**

(a) Compiled using linked ENT teleotology and audiology data collections based on HRN. Uses middle 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 middle ear condition at ENT consultation was used.

(b) Excludes service recipients with an unknown or invalid HRN.

(c) No middle 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 for children and young people where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology and ENT teleotology data collections (services provided on or before 30 June 2014).

Table A6.2: Type of middle ear condition[(a)], children and young people[(b)] who received an audiology or ENT service, by age, 2012–13 and 2013–14

	Age group (years)							
	0–5		6–11		12–20		Total	
Type of middle ear condition	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
2012–13								
At least 1 type of middle ear condition	304	75.8	266	54.6	119	49.0	689	60.9
OME	139	34.7	84	17.2	20	8.2	243	21.5
ETD	60	15.0	85	17.5	20	8.2	165	14.6
CSOM with discharge	45	11.2	39	8.0	18	7.4	102	9.0
Dry perforation	25	6.2	43	8.8	42	17.3	110	9.7
AOM	52	13.0	11	2.3	6	2.5	69	6.1
Foreign body/other	61	15.2	66	13.6	41	16.9	168	14.9
No middle ear condition[(c)]	97	24.2	221	45.4	124	51.0	442	39.1
Total service recipients	**401**	**100.0**	**487**	**100.0**	**243**	**100.0**	**1,131**	**100.0**
2013–14								
At least 1 type of middle ear condition	498	73.0	460	65.0	247	61.6	1,205	67.3
OME	235	34.5	142	20.1	49	12.2	426	23.8
ETD	130	19.1	111	15.7	35	8.7	276	15.4
CSOM with discharge	80	11.7	116	16.4	64	16.0	260	14.5
Dry perforation	46	6.7	89	12.6	66	16.5	201	11.2
AOM	78	11.4	21	3.0	9	2.2	108	6.0
Foreign body/other	61	8.9	98	13.8	81	20.2	240	13.4
No middle ear condition[(c)]	184	27.0	248	35.0	154	38.4	586	32.7
Total service recipients	**682**	**100.0**	**708**	**100.0**	**401**	**100.0**	**1,791**	**100.0**
Total[(d)]								
At least 1 type of middle ear condition	802	74.1	726	60.8	366	56.8	1,894	64.8
OME	374	34.5	226	18.9	69	10.7	669	22.9
ETD	190	17.5	196	16.4	55	8.5	441	15.1
CSOM with discharge	125	11.5	155	13.0	82	12.7	362	12.4
Dry perforation	71	6.6	132	11.0	108	16.8	311	10.6
AOM	130	12.0	32	2.7	15	2.3	177	6.1
Foreign body/other	122	11.3	164	13.7	122	18.9	408	14.0
No middle ear condition[(c)]	281	25.9	469	39.2	278	43.2	1,028	35.2
Total service recipients	**1,083**	**100.0**	**1,195**	**100.0**	**644**	**100.0**	**2,922**	**100.0**

(a) Compiled using linked ENT teleotology and audiology data collections based on HRN. Uses middle 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 middle ear condition at ENT consultation was used.

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

(c) No middle 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 provided only for services where consent was obtained.

Source: AIHW analysis of hearing health outreach audiology and ENT teleolotogy data collections (services provided on or before 30 June 2014).

Table A6.3: Hearing loss status by middle ear condition[(a)], children and young people who received an audiology or ENT service, 2012–13 and 2013–14[(b)]

Type of middle ear condition	No hearing loss	Hearing loss status: Bilateral	Hearing loss status: Unilateral	Subtotal of hearing loss	Missing[(c)(d)]	Total
2012–13						
At least 1 type of middle ear condition	23.7	34.7	19.3	54.0	22.4	100.0
OME	9.9	46.9	15.2	62.1	28.0	100.0
ETD	50.9	18.2	18.8	37.0	12.1	100.0
CSOM with discharge	3.9	53.9	19.6	73.5	22.5	100.0
Dry perforation	15.5	36.4	36.4	72.7	11.8	100.0
AOM	7.2	43.5	8.7	52.2	40.6	100.0
Foreign body/other[(e)]	29.8	23.2	22.0	45.2	25.0	100.0
No middle ear condition[(f)]	74.4	8.1	5.0	13.1	12.4	100.0
Total service recipients[(g)]	**43.5**	**24.3**	**13.7**	**38.0**	**18.5**	**100.0**
2013–14						
At least 1 type of middle ear condition	18.8	43.8	24.6	68.5	12.7	100.0
OME	9.2	55.4	16.9	72.3	18.5	100.0
ETD	35.1	31.5	23.2	54.7	10.1	100.0
CSOM with discharge	7.3	56.2	28.1	84.2	8.5	100.0
Dry perforation	9.5	48.3	37.8	86.1	4.5	100.0
AOM	10.2	41.7	16.7	58.3	31.5	100.0
Foreign body/other[(e)]	31.3	35.0	25.8	60.8	7.9	100.0
No middle ear condition[(f)]	67.4	12.3	7.3	19.6	13.0	100.0
Total service recipients[(g)]	**34.7**	**33.5**	**19.0**	**52.5**	**12.8**	**100.0**
Total[(h)]						
At least 1 type of middle ear condition	20.6	40.5	22.7	63.2	16.2	100.0
OME	9.4	52.3	16.3	68.6	22.0	100.0
ETD	41.0	26.5	21.5	48.1	10.9	100.0
CSOM with discharge	6.4	55.5	25.7	81.2	12.4	100.0
Dry perforation	11.6	44.1	37.3	81.4	7.1	100.0
AOM	9.0	42.4	13.6	55.9	35.0	100.0
Foreign body/other[(e)]	30.6	30.1	24.3	54.4	15.0	100.0
No middle ear condition[(f)]	70.4	10.5	6.3	16.8	12.7	100.0
Total service recipients[(g)]	**38.1**	**29.9**	**16.9**	**46.9**	**15.0**	**100.0**

(a) Compiled using linked ENT teleotology and audiology data collections based on HRN. Uses middle 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 middle ear condition at ENT consultation was used.

(b) Excludes children 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 received only an ENT service (that is, no audiology service received), 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 middle ear condition was reported for both ears.

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

(h) Total includes children who received services between July 2012 and June 2014.

Note: Data are provided only 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 2014).

Table A6.4: Degree of hearing impairment by middle ear condition[(a)], children and young people who received an audiology or ENT service, 2012–13 and 2013–14[(b)] (per cent)

		Degree of hearing impairment					
Type of middle ear condition	No hearing impairment	Mild	Moderate	Severe/ profound	Subtotal of hearing impairment	Missing[(c)(d)]	Total
2012–13							
At least 1 type of middle ear condition	47.5	26.7	11.3	0.3	38.3	14.2	100.0
OME	32.9	35.4	15.2	—	50.6	16.5	100.0
ETD	72.1	18.2	2.4	—	20.6	7.3	100.0
CSOM with discharge	28.4	40.2	17.6	—	57.8	13.7	100.0
Dry perforation	55.5	30.0	5.5	1.8	37.3	7.3	100.0
AOM	20.3	33.3	23.2	1.4	58.0	21.7	100.0
Foreign body/other [(e)]	54.8	19.0	8.3	0.6	28.0	17.3	100.0
No middle ear condition[(f)]	80.1	7.0	1.4	0.2	8.6	11.3	100.0
Total service recipients[(g)]	**60.2**	**19.0**	**7.4**	**0.3**	**26.7**	**13.1**	**100.0**
2013–14							
At least 1 type of middle ear condition	44.6	31.2	13.1	0.5	44.8	10.6	100.0
OME	27.7	41.5	15.7	0.7	58.0	14.3	100.0
ETD	60.5	27.2	3.6	—	30.8	8.7	100.0
CSOM with discharge	35.8	34.6	20.8	0.8	56.2	8.1	100.0
Dry perforation	49.3	30.8	13.9	1.0	45.8	5.0	100.0
AOM	25.9	26.9	19.4	—	46.3	27.8	100.0
Foreign body/other[(e)]	59.2	27.5	6.3	0.8	34.6	6.3	100.0
No middle ear condition[(f)]	75.8	9.4	1.9	0.2	11.4	12.8	100.0
Total service recipients[(g)]	**54.8**	**24.1**	**9.4**	**0.4**	**33.9**	**11.3**	**100.0**
Total[(h)]							
At least 1 type of middle ear condition	45.6	29.6	12.5	0.4	42.4	11.9	100.0
OME	29.6	39.3	15.5	0.4	55.3	15.1	100.0
ETD	64.9	23.8	3.2	—	27.0	8.2	100.0
CSOM with discharge	33.7	36.2	19.9	0.6	56.6	9.7	100.0
Dry perforation	51.4	30.5	10.9	1.3	42.8	5.8	100.0
AOM	23.7	29.4	20.9	0.6	50.8	25.4	100.0
Foreign body/other[(e)]	57.4	24.0	7.1	0.7	31.9	10.8	100.0
No middle ear condition[(f)]	77.6	8.4	1.7	0.2	10.2	12.2	100.0
Total service recipients[(g)]	**56.9**	**22.1**	**8.7**	**0.3**	**31.1**	**12.0**	**100.0**

(continued)

Table A6.4 (continued): Degree of hearing impairment by middle ear condition(a), children and young people who received an audiology or ENT service, 2012–13 and 2013–14(b)

(a) Compiled using linked ENT teleotology and audiology data collections based on HRN. Uses middle 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 middle ear condition at ENT consultation was used.

(b) Excludes children 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 received only an ENT service (that is, no audiology service received), 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 middle ear condition reported for both ears.

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

(h) Total includes children who received services between July 2012 and June 2014.

Note: Data are provided only 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 2014).

Table A6.5: Change in prevalence of middle ear conditions between first and last SFNT service(a)(b)

	First SFNT service		Last SFNT service			
Type of middle ear condition	**Number**	**Per cent**	**Number**	**Per cent**	**Per cent change (y–x)÷x**	**Percentage point difference (y–x)**
At least one type of middle ear condition	619	79.3	594	76.1	–4.0	–3.2
OME	201	25.7	189	24.2	–6.0	–1.5
ETD	101	12.9	133	17.0	31.7	4.1
CSOM	158	20.2	156	20.0	–1.3	–0.3
Dry perforation	131	16.8	113	14.5	–13.7	–2.3
AOM	77	9.9	46	5.9	–40.3	–4.0
Foreign body	11	1.4	11	1.4	0.0	0.0
Other(c)	103	13.2	107	13.7	3.9	0.5
No middle ear condition(d)	162	20.7	187	23.9	15.4	3.2
Total children(e)	**781**	**100.0**	**781**	**100.0**	. .	. .

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

(b) 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 with missing response for middle ear condition.

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

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

(e) The sum of the columns may be more than 100% as children may have more than one middle ear condition.

Note: Data are provided only 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 2014).

Table A6.6: Children and young people with OME, CSOM with discharge, AOM or dry perforation 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 2014(a)(b)

		First service		Second last service		Last service	
Age group	**Total children**	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
0–2	248	184	74.2	161	64.9	148	59.7
3–5	388	317	81.7	265	68.3	204	52.6
6–20	735	608	82.7	497	67.6	404	55.0
Total	**1,371**	**1,109**	**80.9**	**923**	**67.3**	**756**	**55.1**

(a) 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.

(b) 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 with missing response for middle ear condition.

Note: Data are provided only 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 2014).

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.

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).

dry perforation: 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.

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 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: The presence of intact eardrum and middle ear fluid without symptoms or signs of acute infection. Other terms used to describe otitis media with effusion include 'glue ear', 'serous otitis media' and 'secretory otitis media'. Otitis media with effusion 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 and/or 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

This report presents analyses on hearing health outreach services provided to Indigenous children and young people in the Northern Territory, funded through the Australian Government in 2012–13 and 2013–14. It reports the number and proportion of children and young people who received outreach audiology, ENT teleotology, and Child Hearing Health Coordinator services, as well as information about the hearing status and middle ear conditions among service recipients. Of the 2,854 children and young people who received audiology services between July 2012 and June 2014, hearing loss was present in 51% at their latest service; however, among those who received 2 or more of these services, there were functional improvements in hearing over time.